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Interior, St. Paul's Church, Wood Green ..... Mr. E. Goldie, Architect.
Tower and Porch, St. Mary's Church, Yate, Glos. ..... Mr. W. D. Caröe, F.R.I.B.A., Architect.
Casket and Official Chain for the Corporation of Preston ..... Designed by Miss Florence Steel.
Design for a Small Country House ..... By Mr. J. Henry Sellar.
Gate House and Masters' Lodgings, Abingdon School ..... Mr. Harry Redfern, Architect.

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Engineering Subjects at the British Association: A Retrospect.

IN opening the proceedings of the Engineering Section at the recent meeting of the British Association, Mr. Charles Hawksley made reference, in his presidential address, to technical education—a subject that is discussed at almost every meeting of scientific bodies in the present day. Mr. Hawksley was commendably brief in dealing with this question, and the most noteworthy feature of his remarks was an expression of the hope that in the future training of engineering students, increased attention would be paid to the combination of artistic merit with excellence of structural design. With this aspiration we are most heartily in accord. It may or may not be true that, as we are sometimes told, architects are taught design without adequate training in construction, but it is tolerably certain that engineers receive practically no instruction with regard to artistic design. Undoubtedly, it is a fact that the main outlines of an engineering structure are dictated by principles that inevitably lead to correct results, but engineers very frequently go astray when dealing with final details, which cannot be designed by the aid of mathematics. There are many forms of engineering construction in which any attempt to improve upon the absolute simplicity of pure structure would only lead to grotesque absurdity; and on the other hand, there are many types of engineering work, especially bridges and other structures of monumental character, where complete harmony and correct effect are only attainable by the combination of science with art. Considering the many subjects that must be mastered by the engineering student, we do not for a moment believe that it would be possible for him to acquire a sufficient knowledge of artistic design, so as to enable him in after practice to dispense with the co-operation of the architect when important structural works have to be erected in public places. Still, the idea brought forward by Mr. Hawksley is a good one, and we should like to hear more of the suggestion.

After mention of the valuable work now being conducted by the Engineering Standards Committee, the subject of intercommunications was taken up by the president of the section. Road traffic, self-propelled vehicles, electric tramways, light railways, and railways were in turn reviewed. Referring to what we are now almost compelled to term "steam railways," Mr. Hawksley showed that several of the leading railway companies are now turning their attention to improved methods of traction, and he instanced the Mersey Railway as the first example of a British railway converted to the use of electric traction. It is interesting to note that on this line adequate precautions have been taken against fire. The electrical equipment is thoroughly fireproof, the motor compartment being cased in asbestos slate, cutting it off completely from the remainder of the train.

The address was further devoted to canals, shipbuilding, wireless telegraphy, and sewage disposal, and after some remarks on the Liverpool Docks and the Nile Irrigation Works, it concluded with a somewhat technical consideration of waterworks engineering and management. As an introduction to the discussions to be anticipated at a meeting of engineers of all classes, this address was in every way suitable. Practically every department of engineering received due notice, and the author did not omit to speak fully on the subject—that of water supply—with which he is most intimately associated. It is rather a pity that this spirit of catholicism was less evident in the business afterwards coming before the section. Although many instructive papers were read, too large a proportion referred to electrical apparatus and traffic problems, while constructional engineering scarcely received the attention that might have been expected. It is true that Mr. Cuthbert Brereton gave a short description of the new bridge at Kew, but this was the only communication relative to structural work.

Mr. J. Harrison followed with a paper of purely mathematical character, illustrating the application of graphical methods to engineering computations, and more particularly to such as are necessary in machine design. This, again, was the only paper in its class, a circumstance not altogether to be regretted, for although the science of mathematics is of paramount importance, we are not quite sure that it is a subject that can be usefully and sufficiently discussed during so brief a session as that of the British Association.

At the next day's meeting attention was almost exclusively devoted to the question of road locomotion and motor traffic. A report was received from a committee, of which Sir John Thornycroft is chairman and Professor Hele-Shaw is secretary, appointed to consider the resistance of vehicles to traction. In this report were described experiments made with different kinds of tyres on different forms of roadway and at varying velocities of travel. From diagrams given, it appears that tractive effort diminishes proportionally with the increase of velocity. The explanation of this suggestive fact is probably that the faster a wheel travels the less time it has to fall into the hollows in the roadway, with the result that it skims along the tops of ridges and irregularities. Some further experiments, made with the object of ascertaining the most suitable design of wheel for heavy traffic, were also described in the report, the general conclusion being that little advantage is to be gained by adopting tyres of more than 9 in. wide in the direction of reducing road resistance and damage to the surface. We observe that further experiments are proposed for the purpose of testing the accuracy of this conclusion. At the same time it would be desirable to inquire into the best means of preventing the clouds of dust which are the usual accompaniments of self-propelled vehicles travelling on macadam roads in dry and even in moderately dry weather. It is no doubt de-

sirable that the expenditure of mechanical power should be kept within proper limits, but to the community at large it is more important that the dust-producing power of mechanically-propelled vehicles should be reduced to a minimum.

This point was discussed in connexion with a paper by Mr. Clarkson on "Locomobile Design." Mr. Worby Beaumont then stated that trials were about to be made with the view of ascertaining the best means of preventing dust, and he appeared to be of opinion that the dust question could probably be settled by improved road construction. We cannot agree with this view so far as macadam roads are concerned, for a low-bodied motor-car is capable of raising large volumes of dust from the very best forms of surface. The nuisance might be mitigated in some measure by enacting that no part of the body of any self-propelled vehicle should be nearer the ground than, say, 3ft.; but it seems probable that the only real remedy would be the universal adoption of tar macadam or asphalt. Such a proposal would at once suggest difficulties of economic and fiscal character which we cannot now pause to discuss. It is evident, however, that so long as road surfaces are formed of friable materials, merely bound together with powdered stone and water, there will always be dust that must inevitably be raised by wind, vehicles, and other disturbing elements.

The last paper contributed at the sitting to which we now refer was by Colonel Crompton, R.E., on "The Problem of Modern Street Traffic." It was pointed out by the author that, notwithstanding the improved means of communication now available, the average speed of travel in large cities does not exceed about five miles an hour. This anomalous and highly unsatisfactory condition is largely brought about by the enormous amount of traffic conducted at a walking pace, and also by the obstruction of streets by vehicles standing at the kerb, or aimlessly wandering from place to place. Foot passengers also add to the difficulty, as they are at present entitled to the use of the roadway or footway just as they please. In order to deal satisfactorily with these and other difficulties, the author advised the establishment of a department of the police to take special control of street traffic. This department would be empowered to determine what classes of vehicles were fit and proper to be employed, and to advise authorities as to by-laws and regulations, and upon street improvements, crossings, railways, subways, and tramways.

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Two or three papers read during the ensuing meeting dealt with the application of certain problems of physical science to mechanical engineering. One of these, by Mr. C. H. Wingfield, on "Permanent Set in Cast Iron Due to Small Stresses," was of considerable interest. The author showed that piston rings, each consisting of an inner and outer ring of uniform section, differed materially in the quality of their outward pressures per square inch of circumference, whereas by the formulæ generally published they should agree in this respect. Other experiments described by him made clear the fact that when spring-rings had been forced into circular gauges, they suffered material permanent set during the first fifteen minutes. It was also found that a measurable degree of set was producible by merely squeezing a ring of this kind between the hands. The amount of spring in a cast-iron ring appears to be much greater than is generally realised. According to the author, a spring-ring about 5½in. in diameter, and with its ends 1½in. apart, after deducting the permanent set, can be bent until they meet, and when released they spring back again to 1½in. apart. It is to be regretted that very little time was available for the discussion of this paper, and the same remark applies to a subsequent communication by Mr. E. G. Izod, on "The Brittleness of Steel."

After other papers had been read upon "Experiments with Air Friction," "Single Phase Repulsion Motors," and "A New Form of Mirror Extensometer," Mr. J. W. Thomas brought before the meeting the subject of "Ventilation in Tube Railways," dealing chiefly with the physical conditions necessary for securing adequate ventilation in such systems. The author expressed the undoubtedly correct opinion that the forces due to the moving

trains, and the natural heat of the subways, would be ample for the required object if properly directed. This is a view we have more than once expressed, and we are glad to find it has been clearly brought before the British Association. Mr Thomas proposes a triple-station arrangement, and his scheme will be understood from the following brief outline:—If the three stations of the group be called A, B, and C, a down train travelling from A to B would draw air from the station A, and expel it in station B, and an up train travelling from C to B would draw air from station C and expel it in station B. Owing to the elasticity of air, the outlets for expelling the vitiated atmosphere must be situated not far from the points of greatest compression, and should begin in the centre of each underground station, and end in the open air above the surface station. For a similar reason the fresh air intakes should be near the points where the sudden expansion of the air will take place. These points are just inside the ends of the tubes entered by the moving trains. Airtight doors should be fitted at the ends of the two tubes, and by closing these doors behind the last trains at night the fresh air brought into the end of the tube immediately beyond the doors would continue to act during the night, driving the foul air into the next station by natural ventilating pressure. By closing the doors after some of the trains as they left the stations, it is suggested that fresh air would be drawn into the tubes during the day time. This system does not seem to be entirely adequate for the purpose of effecting the ventilation of a tubular railway. One great difficulty on the lines already in operation is caused by intercommunications between the up and down tubes, and the only satisfactory arrangement would be the complete and absolute separation of each station into two parts, one for up and the other for down traffic. Then, by the suitable provision of doors, it would be possible to ensure a complete and thorough renewal of the atmosphere along the whole line. As all the trains in each tube would move in one direction only it would be possible to provide for a regular current of air from a main inlet at one end, to a main outlet at the other, or to arrange for fresh air to be drawn in at some stations and ejected at others. Low level railways now in operation appear to have been designed entirely without regard to ventilation, and their condition grows daily worse. In the design of new lines, however, there should be no difficulty, and those responsible for their construction certainly ought to take the advice of ventilating experts, so that the state of things existing in the City and South London and Central London Railways may not be reproduced.

We have not attempted to refer to all the papers presented before the recent meeting of the British Association, but it will be gathered that some of the most important departments of engineering work were practically ignored. It is true that many useful papers were read, and that those relative to traffic problems were especially valuable. Nevertheless, the success of the engineering section might have been far greater if the subjects for discussion had been more varied. Another feature tending to detract from the usefulness of the session was to be found in the excessive number of papers crowded into each sitting, with the result that little or no time was available for discussion of the subjects opened. Consequently, members became wearied by the reading of paper after paper; and finding practically no opportunity of taking part in the proceedings, or of profiting by listening to the expression of varied opinions upon the problems brought forward, they had little inducement to continue in attendance. The fact that many of the papers were read to meetings comprising no more than five or six members is conclusive evidence that the organisation of the section was far from satisfactory. Those upon whom devolves the arrangement of the proceedings would do well to remember that the complete discussion of one subject is of far greater value than the accumulation of numerous papers, which have to be hurried through owing to the limited time at disposal, and so do not receive anything like the attention that they may frequently deserve. On the whole, while fully recognising the merits of many papers read and discussed, it must be said that this year's meeting of the engineering section has been somewhat disappointing to those who look upon the British Association meeting as a function at which the views of the leading scientists in the country will be expressed for the advantage of the nation at large.

NOTES.

Technical Education.

It is to be regretted that the Board of Education do not preface the annual return as to the funds expended by local authorities on technical education by a comprehensive survey and criticism. The large number of figures are, no doubt, important, but we should like to see the results of them formulated. The total amount expended during the year 1901-2 in technical education in England and Wales was 1,057,000*l*. The question at once arises, is this large sum expended to the best advantage? In perusing the returns, one point which is striking is the large amount spent in small sums handed to small local places. We find, for instance, and we take these examples as they occur, that 5*l*. was granted to Irlam, in Lancashire, for technical education; 8*l*. 13s. to Great Harwood; and so on. In other words, there is all over the United Kingdom a large sum annually spent on what for a better word we call "amateur" technical education—that is, teaching which will not lead to any real results, but is rather in the nature of a winter pastime. It is to be hoped, however, that the County Councils will take steps to prevent this waste of money, and will try to create local centres for the purposes of technical education, as well as links between the elementary schools and the centres of technical instruction, so that the latter may be placed on a systematic basis.

London Statistics.

The Report issued by the County Council of London Statistics contains matter of much interest to Londoners. The population of London or Greater London—that is, including parishes within fifteen miles of Charing Cross—is returned as 6,581,402, and in the face of this gigantic total it is some satisfaction to find that during the last decade the percentage of increase is diminishing. Another satisfactory feature is that in the administrative County of London the number of tenements is increasing faster than the population, and that the number of the population described as "overcrowded," that is to say where more than two persons live in one room in tenements of from one to four rooms, has decreased by 3.7 per cent. But the expenditure involved in clearing insanitary areas is very large compared with the number of people displaced and rehoused, and since the County Council came into being 4,326,000*l*. has been expended in housing 89,000 persons. A sum of 48*l*. per head would seem stupendous were it not for the consideration of the gain to the whole community in carrying out these operations. Some statistics on traffic in the Strand and Holborn will be read with interest by the public and by the Commission on the means of communication in London. During twelve daylight hours 19,724 vehicles passed a fixed point in the Strand and 15,590 in Holborn. The stoppages of over half a minute necessitated by traffic regulation over this number of vehicles represented respectively seven hours and a half, and five hours and a quarter—a loss of time of only a little over one second for each vehicle, but as a matter of fact the whole delay fell on only 9,511 vehicles, and those accustomed to endure what appears such constant delay in traversing those thoroughfares will be surprised to find it work out at so small a figure—some 2¼ seconds for each vehicle thus held up. The Report contains some 800 pages, and the statistics on finance and local government will repay careful study.

A Piece of the Old London Wall.

The clearing of the site of Newgate Prison has brought to light some remains of the Roman wall of London, which on that side was built, standing north and south, along the crest of the slope at the foot of which ran the turbulent Fleet. Whilst the prison was in use the wall could be seen along the east side of a passage that communicated between the jail and the Central Criminal Court, and a continuation of it, southwards, still forms the western boundary of the garden appertaining to the houses in Amen-court of the Canons of St. Paul's. The wall, in the prison, was covered with plaster, in which were scratched the initials of the names of condemned felons who had been buried in quick-lime beneath the flag-stones of the passage. The passage, open to the sky, and having the high wall of the "Women's Side" along its west side, was commonly known as "Birdcage-walk," because it was guarded overhead with strong bars and cross-rails. Some other vestiges of past times have been also discovered—amongst them being remains of the earlier prison, of which the gate that stood across Newgate-street formed part, and the sewers, which were originally passages leading out of an underground vault beneath the street. In the basement story of the prison as reconstructed after the Great Fire were the Keeper's House (beneath which lay the Condemned Hold) and the Lodge, to the

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Two or three papers read during the ensuing meeting dealt with the application of certain problems of physical science to mechanical engineering. One of these, by Mr. C. H. Wingfield, on "Permanent Set in Cast Iron Due to Small Stresses," was of considerable interest. The author showed that piston rings, each consisting of an inner and outer ring of uniform section, differed materially in the quality of their outward pressures per square inch of circumference, whereas by the formulæ generally published they should agree in this respect. Other experiments described by him made clear the fact that when spring-rings had been forced into circular gauges, they suffered material permanent set during the first fifteen minutes. It was also found that a measurable degree of set was producible by merely squeezing a ring of this kind between the hands. The amount of spring in a cast-iron ring appears to be much greater than is generally realised. According to the author, a spring-ring about 5½in. in diameter, and with its ends 1½in. apart, after deducting the permanent set, can be bent until they meet, and when released they spring back again to 1½in. apart. It is to be regretted that very little time was available for the discussion of this paper, and the same remark applies to a subsequent communication by Mr. E. G. Izod, on "The Brittleness of Steel."

After other papers had been read upon "Experiments with Air Friction," "Single Phase Repulsion Motors," and "A New Form of Mirror Extensometer," Mr. J. W. Thomas brought before the meeting the subject of "Ventilation in Tube Railways," dealing chiefly with the physical conditions necessary for securing adequate ventilation in such systems. The author expressed the undoubtedly correct opinion that the forces due to the moving

trains, and the natural heat of the subways, would be ample for the required object if properly directed. This is a view we have more than once expressed, and we are glad to find it has been clearly brought before the British Association. Mr Thomas proposes a triple-station arrangement, and his scheme will be understood from the following brief outline:—If the three stations of the group be called A, B, and C, a down train travelling from A to B would draw air from the station A, and expel it in station B, and an up train travelling from C to B would draw air from station C and expel it in station B. Owing to the elasticity of air, the outlets for expelling the vitiated atmosphere must be situated not far from the points of greatest compression, and should begin in the centre of each underground station, and end in the open air above the surface station. For a similar reason the fresh air intakes should be near the points where the sudden expansion of the air will take place. These points are just inside the ends of the tubes entered by the moving trains. Airtight doors should be fitted at the ends of the two tubes, and by closing these doors behind the last trains at night the fresh air brought into the end of the tube immediately beyond the doors would continue to act during the night, driving the foul air into the next station by natural ventilating pressure. By closing the doors after some of the trains as they left the stations, it is suggested that fresh air would be drawn into the tubes during the day time. This system does not seem to be entirely adequate for the purpose of effecting the ventilation of a tubular railway. One great difficulty on the lines already in operation is caused by intercommunications between the up and down tubes, and the only satisfactory arrangement would be the complete and absolute separation of each station into two parts, one for up and the other for down traffic. Then, by the suitable provision of doors, it would be possible to ensure a complete and thorough renewal of the atmosphere along the whole line. As all the trains in each tube would move in one direction only it would be possible to provide for a regular current of air from a main inlet at one end, to a main outlet at the other, or to arrange for fresh air to be drawn in at some stations and ejected at others. Low level railways now in operation appear to have been designed entirely without regard to ventilation, and their condition grows daily worse. In the design of new lines, however, there should be no difficulty, and those responsible for their construction certainly ought to take the advice of ventilating experts, so that the state of things existing in the City and South London and Central London Railways may not be reproduced.

We have not attempted to refer to all the papers presented before the recent meeting of the British Association, but it will be gathered that some of the most important departments of engineering work were practically ignored. It is true that many useful papers were read, and that those relative to traffic problems were especially valuable. Nevertheless, the success of the engineering section might have been far greater if the subjects for discussion had been more varied. Another feature tending to detract from the usefulness of the session was to be found in the excessive number of papers crowded into each sitting, with the result that little or no time was available for discussion of the subjects opened. Consequently, members became wearied by the reading of paper after paper; and finding practically no opportunity of taking part in the proceedings, or of profiting by listening to the expression of varied opinions upon the problems brought forward, they had little inducement to continue in attendance. The fact that many of the papers were read to meetings comprising no more than five or six members is conclusive evidence that the organisation of the section was far from satisfactory. Those upon whom devolves the arrangement of the proceedings would do well to remember that the complete discussion of one subject is of far greater value than the accumulation of numerous papers, which have to be hurried through owing to the limited time at disposal, and so do not receive anything like the attention that they may frequently deserve. On the whole, while fully recognising the merits of many papers read and discussed, it must be said that this year's meeting of the engineering section has been somewhat disappointing to those who look upon the British Association meeting as a function at which the views of the leading scientists in the country will be expressed for the advantage of the nation at large.

NOTES.

Technical Education. It is to be regretted that the Board of Education do not preface the annual return as to the funds expended by local authorities on technical education by a comprehensive survey and criticism. The large number of figures are, no doubt, important, but we should like to see the results of them formulated. The total amount expended during the year 1901-2 in technical education in England and Wales was 1,057,000*l.* The question at once arises, is this large sum expended to the best advantage? In perusing the returns, one point which is striking is the large amount spent in small sums handed to small local places. We find, for instance, and we take these examples as they occur, that 5*l.* was granted to Irlam, in Lancashire, for technical education; 8*l.* 13s. to Great Harwood; and so on. In other words, there is all over the United Kingdom a large sum annually spent on what for a better word we call "amateur" technical education—that is, teaching which will not lead to any real results, but is rather in the nature of a winter pastime. It is to be hoped, however, that the County Councils will take steps to prevent this waste of money, and will try to create local centres for the purposes of technical education, as well as links between the elementary schools and the centres of technical instruction, so that the latter may be placed on a systematic basis.

London Statistics. The Report issued by the County Council of London Statistics contains matter of much interest to Londoners. The population of London or Greater London—that is, including parishes within fifteen miles of Charing Cross—is returned as 6,581,402, and in the face of this gigantic total it is some satisfaction to find that during the last decade the percentage of increase is diminishing. Another satisfactory feature is that in the administrative County of London the number of tenements is increasing faster than the population, and that the number of the population described as "overcrowded," that is to say where more than two persons live in one room in tenements of from one to four rooms, has decreased by 3.7 per cent. But the expenditure involved in clearing insanitary areas is very large compared with the number of people displaced and rehoused, and since the County Council came into being 4,326,000*l.* has been expended in housing 89,000 persons. A sum of 48*l.* per head would seem stupendous were it not for the consideration of the gain to the whole community in carrying out these operations. Some statistics on traffic in the Strand and Holborn will be read with interest by the public and by the Commission on the means of communication in London. During twelve daylight hours 19,724 vehicles passed a fixed point in the Strand and 15,590 in Holborn. The stoppages of over half a minute necessitated by traffic regulation over this number of vehicles represented respectively seven hours and a half, and five hours and a quarter—a loss of time of only a little over one second for each vehicle, but as a matter of fact the whole delay fell on only 9,511 vehicles, and those accustomed to endure what appears such constant delay in traversing those thoroughfares will be surprised to find it work out at so small a figure—some 2¼ seconds for each vehicle thus held up. The Report contains some 800 pages, and the statistics on finance and local government will repay careful study.

A Piece of the Old London Wall. The clearing of the site of Newgate Prison has brought to light some remains of the Roman wall of London, which on that side was built, standing north and south, along the crest of the slope at the foot of which ran the turbulent Fleet. Whilst the prison was in use the wall could be seen along the east side of a passage that communicated between the jail and the Central Criminal Court, and a continuation of it, southwards, still forms the western boundary of the garden appertaining to the houses in Amen-court of the Canons of St. Paul's. The wall, in the prison, was covered with plaster, in which were scratched the initials of the names of condemned felons who had been buried in quick-lime beneath the flag-stones of the passage. The passage, open to the sky, and having the high wall of the "Women's Side" along its west side, was commonly known as "Birdcage-walk," because it was guarded overhead with strong bars and cross-rails. Some other vestiges of past times have been also discovered—amongst them being remains of the earlier prison, of which the gate that stood across Newgate-street formed part, and the sewers, which were originally passages leading out of an underground vault beneath the street. In the basement story of the prison as reconstructed after the Great Fire were the Keeper's House (beneath which lay the Condemned Hold) and the Lodge, to the

north and south, respectively, of the gateway; the Stone Hold (Felons' Common Side); the Stone Hall and Tangier (Common Debtors' Side); Hall Ward (Master Debtors' Side); and other rooms; and the Press Yard, to the east. There is record of the escape on more occasions than one of prisoners by way of the sewers into the channel of the Fleet. A deep well that has just been found amongst the ruins is supposed to be that which formerly supplied the prison with water.

The "Fatigue" of Cement Products.

IN the current issue of the "Proceedings of the American Society of Civil Engineers" an account is given of the first results obtained from an investigation undertaken to determine the behaviour of Portland cement mixtures when subjected to repeated loads of less intensity than would cause failure when once applied. There is every reason for thinking it probable that concrete is liable to fatigue under repetitions of stress, such as is experienced by iron and steel under similar conditions, but so far as we are aware no previous systematic attention has been paid to this characteristic. The experiments to which we now refer were conducted at Washington University upon 2 in. cubes composed of neat cement. Altogether, some ninety-two blocks were tested by repetitions of compressive stress, and the average results in the following table are taken from a diagram reproduced in the "Proceedings":—

No. of repetitions causing failure.	Load applied in terms of ultimate strength.
1	100 per cent.
75	90 "
150	80 "
400	70 "
1,500	60 "
5,500	55 "

These figures indicate that failure occurs under repeated loadings of much less intensity than that necessary to cause failure when applied once, and that the number of repetitions necessary to cause failure increases proportionately with the diminution of load. Similar tests upon concrete have not yet been conducted upon a systematic scale, but eighteen tests on 7 in. cubes show that the same general law of gradual failure applies equally to concrete. The investigation will be continued as rapidly as circumstances will permit, and we hope to present some further information on the subject in due course.

Concrete-Steel Lattice Girders.

A SOMEWHAT novel system of constructing beams in concrete-steel has recently been devised by Mr. Franz Visintini, a Zurich architect. Briefly described, it may be said to consist in the application of the principle of the Warren girder to concrete-steel beams. The framework is of concrete, reinforced with iron or steel rods in the tension members, while the members subject to compression only are formed of concrete alone. In the upper and lower flanges or booms the concrete is reinforced with cylindrical rods. So far as carrying capacity is concerned, there is no necessity for reinforcement in the compression booms, but its addition affords a simple and satisfactory means of connexion between ties and flanges. When employed in floor construction, small girders, made in the manner described, are laid side by side, and the recesses can be filled with concrete if desired. In order to prevent any of the individual girders from abnormal bending, thereby causing cracks in the ceiling, the girders are provided with longitudinal recesses of such shape as to produce dovetail grooves. Reinforcement is placed in these, and they are then filled up with cement mortar. The system is suitable for the construction of columns, walls, and other parts of a building, and it is claimed that the air-flues formed by the latticed webs of the members are useful as heating flues, or as conduits for pipes and wires. There seems to be reason for anticipating great rigidity in members designed on this system; the materials are clearly utilised in a most economical manner, and weight is reduced to a minimum.

Water Supply, Thorne (West Riding).

THE Local Government Board has issued a Report by Dr. Reece on the water supply, sanitary circumstances, and administration of the Thorne Rural District (West Riding of Yorkshire), which discloses an exceedingly discreditable state of things. The main source of the water is a navigable canal, which receives the refuse of a large floating population, and is fed by the waters of the Don, which is itself polluted by sewage and other refuse matters in its course through Rotherham, Sheffield, and Mexborough districts. The remainder of the supply is from shallow wells, liable to contamination from privy middens, which are the usual arrangement for excreta in the district. Coarse filters are provided between the canal and the drinking supply, but Dr. Reece found the water at the time of his visit passing directly over the top of the filtering material to the town, and in any case it is reported that the filter is in itself too inefficient to effect any great improvement in the condition of the water. It is stated that the Reports of their Medical Officer of Health have warned the local Council from year to year of the sanitary needs of the district, but "whenever anything requiring the expenditure of money on sanitary reform has come before the Council, the matter has been almost invariably shelved." Unfortunately, the rural districts of England are still full of such incompetent and neglectful public authorities, as the Local Government Board Reports continue from time to time to demonstrate.

Sanitary Condition of Denbigh.

DR. WHEATON'S Report to the Local Government Board on the subject of an outbreak of diphtheria in the Borough of Denbigh conveys the impression that the water-supply is less open to suspicion than is often the case in connexion with such epidemics; but serious fault is found with the condition of the sewerage, and with the prevalence of badly constructed privies in the higher parts of the town, to which the water supply does not extend. At the time of his visit several sewers were blocked or partly blocked by deposit; the sewers were "in a most unsatisfactory condition"; and there is practically no provision for flushing them. Dr. Wheaton makes the following recommendations, amongst others, at the close of his Report:—

"The sewerage of the town should be completely remodelled under the advice of a competent engineer. When the sewers are reconstructed all the old sewers which will retain accumulated deposit should be removed, all house drains should be examined and any defective ones replaced, and old disused drains removed. The new sewers should be duly ventilated, and provided with means for flushing and inspection.

All the midden privies should be removed, and where water is not available for flushing purposes some form of pail closet should be provided, the contents of which should be collected weekly by officers of the Town Council.

The Council should devote increased attention to the condition of dwellings; yards and open spaces around dwellings should be covered with some impermeable material so as to prevent soakage into the ground of water falling on the surface around houses; other causes of dampness of dwellings should be removed and damp courses should be provided. The lime-washing of all dwellings the interiors of which are in a dirty and foul condition should be required."

The Pottery Industry.

IT is a somewhat curious thing that natural supplies of the best china and blue-ball clays should be confined almost exclusively to Cornwall, Devonshire, and Dorsetshire. It is true that similar deposits have been found elsewhere, but not on a sufficient scale to justify their commercial development. In many industries the tendency has become more and more marked for manufacturers to produce, or to control the supply of, their own raw materials. This, however, does not appear to be the case in the pottery industry, which is largely centred in Staffordshire. In that county there are probably at least five hundred potteries, while those in other counties number little more than a hundred collectively. Yellow-ware is produced to a certain extent in Burton and Newcastle-on-Tyne. Earthenware is also made in Glasgow, and by a few firms in Yorkshire, while Bristol furnishes stoneware. All these are alike dependent upon Cornwall and Devon, with the exception of the yellow-ware firms, who are able to obtain the greater part of their supplies from local sources. It may seem anomalous that Staffordshire should be the centre of the pottery industry when the supplies are largely to be found in the extreme west of England, but the fact is that coal is cheap in the former district, and that it is less costly to bring the raw material to the coal than vice-versa. Therefore Cornwall and Devonshire continue to send china clay by sea to Liverpool, whence it is conveyed by canal into Staffordshire. The superior quality of British fireclay goods is chiefly due to the excellent quality of the raw material furnished by the district named, and the recent rumour of an American scheme to secure the control of our natural sources of supply serves to suggest that it would be well if steps could be taken to provide for the protection of the china clay mines from foreign influence. We understand that the Midland manufacturers are already in communication, through the North Staffordshire Chamber of Commerce, with the West of England mine owners, and that should further overtures be made from the United States, the pottery manufacturers will receive early information with the object of giving them an opportunity of securing the clay mines.

The Photographic Salon.

WE have seen better and more interesting collections at the Photographic Salon than this present eleventh one, now open at the Dud-

ley Gallery. We have so often expressed our opinion as to the mistake of trying to claim for photography the place of an art in the true sense of the word, that we need not insist on this point further, but take the Exhibition as we find it. That there is room for artistic judgment in composition, in selecting the best point of view for a landscape photograph, is shown in such a plate as Mr. C. Job's "A Foot-Track after Rain" (48), which almost produces the impression of being a deliberately composed picture. Nature does sometimes lend herself in this way to landscape composition, and the judgment of the photographer is shown partly in knowing what to leave out. Dr. Crump's "Sea Treasures" (184), where a young girl has been photographed as the single figure on a wide expanse of beach, is another very happily selected picture. In the groups, entitled "A Serious Matter" (123), and "Extenuating Circumstances" (147), Miss Constance Ellis has been fortunate in securing sitters who could really act the pose and expression required by the subject; generally speaking one is struck by the futility of these attempts at grouping real people into an ideal subject-picture; but these two are much more successful than usual. Mr. Craigie's large portrait of Mr. Hermann Vezin (42) is very successful in catching expression and character, and avoiding realistic hardness. "Gorse" (31), by Mr. Hinton, is a successful landscape and foreground study, and in this and other examples we may see how photographers are able now to substitute breadth and a certain degree of atmospheric effect for the old style of mechanically printed landscape views in which everything is cut out with steel-like sharpness. How much photography there really is in Dr. Bachmann's "Am Parkthor" (10), we cannot judge; it looks like a large and rather coarse washed drawing in brown monochrome. Architectural subjects, as usual, are little in favour; there is a picturesque view of "Bell Tower, Santa Barbara Mission, California" (99), by Mr. A. L. Coburn, and "An Open Door, Ely Cathedral" (129), by Mr. F. H. Evans, in which a good light effect is caught. Both these are small subjects. Mr. Benington's large view of St. Paul's under the title, "The Church of England" (83), seems to be a purpose-made smudge, as if photographed in a fog; it almost appears as if there were a satirical meaning in this, taken in connexion with the title.

THE BRIDGEWATER CANALS AND TRUST: A FEW HISTORICAL NOTES.

On October 19 next, Francis Egerton, third Earl of Ellesmere, will succeed to the sole ownership of a remarkable trust, of which he became the beneficiary upon attaining his majority thirty-five years ago. The trust was set up by the testamentary dispositions of his collateral predecessor, Francis Egerton, third and last Duke of Bridgewater, who died unmarried on March 8, 1803, when the Earldom of Bridgewater passed to his cousin, General Egerton, who died *s.p.* in 1823. The Duke Francis settled all of his real, and most of his personal, estates under certain trusts whereby the first appointed beneficiary was his nephew, George, second Marquis of Stafford and first Duke of Sutherland, whose father had married Louisa, daughter, and eventually co-heir, of Scroope, first Duke of Bridgewater. As provided in express terms the benefits of the trust devolved, in 1833, upon the Duke of Sutherland's second son, Francis, who in 1846 was elevated to the peerage as Earl of Ellesmere, co. Salop, and Viscount Brackley, and was grandfather of the present holder of that title. The duration of the trust was rendered as long as the law would allow by the choice of a large number of persons and their then living issue, together with the legal extension of twenty-one years in addition; the named persons comprised 359 Peers of the House of Lords in the Session of 1802-3. The Duke declared in his will that he desired, in agreement with the law, to suspend the right to the inheritance so as to keep the works and their trade and the estates thereto annexed as one joint fund under competent management, in order that the public might profit thereby as by the plan adopted in his will for their benefit. The trust property included the Bridgewater canals, the Duke's estates in Cheshire and Lancashire, Brackley, in Northamptonshire, and Bridgewater House, St. James's, together with his collections of MSS., pictures, and other art treasures.

Since the reopening, *temp.* Henry II., of the Roman Foss-dyke, no water conveyance for purposes of commerce cut out of the solid earth was made in England till the beginning, in 1755, of the Sankey Brook navigation, descending from the collieries around St. Helens to the Mersey. It is true that in pursuance of an Act of 1720 the Mersey was rendered navigable for barges of from 60 to 70 tons burthen by the aid of an artificial cut from Warrington to the mouth of the Irwell, and that in 1727, under an Act of 1719, the Douglas was rendered navigable from the Ribble as high as Wigan. Those minor enterprises excepted, we may justly consider the Duke of Bridgewater to be the founder in more modern times of inland navigation in this country, as distinguished from the making of a so-called canal parallel to the bed of the stream that fed it, and as closely as possible to which it was constructed. His canals had their origin in a scheme initiated by his father, Scroope, for rendering navigable the Worsley Brook in the vicinity of his own seat Worsley Hall, Lancashire. The father did not proceed with an Act he had obtained to that intent. The son procured an Act in 1758 enabling him to construct a canal, about 10 miles in length, from Worsley, through Patricroft and Barton, to Salford, and also to Holling Ferry on the Irwell, his chief object being to provide transport of coal from his property to Manchester. As engineer for the work he employed James Brindley, whose acquaintance he made in 1754. Beginning from Worsley Mill, Brindley proceeded as far as the high road from Manchester to Warrington, then, finding it would be more advantageous to carry the canal by an aqueduct over the Irwell at a spot near Barton Bridge, he advised the Duke to apply for another Act (1759) to sanction a departure from the course at first planned, with a continuation to Manchester, and to empower also the construction of a branch canal to extend as far as Longford Bridge, in the township of Stretford, where the high road from Northwich to Manchester crosses the Mersey. The work was completed in 1761. In the following year statutory powers were granted to the Duke for another canal—called by his name—from a junction at Longford Bridge, and so southwards across the Mersey to Timporley and Dunham in Cheshire, and thence westwards through the northern parts of that county to the Hemp-Stones in Halton, below Bank Quay, entering the Mersey at Runcorn Gap, and available for vessels at neap tides; the total distance being about twenty-eight miles. From a junction with that canal at Norton, near Runcorn, Brindley began, under an Act obtained in 1766, the Trent and Mersey, or Grand Trunk, Canal, which by traversing Cheshire, Staffordshire, and Derbyshire, for a length of some 90 miles between Preston Brook and Wilden Ferry, brings the Humber and the Trent into communication with the Mersey, and so joins the North Sea and the Irish Channel.

It were beyond the scope of this short article to describe how skilfully Brindley conquered the many physical difficulties he encountered; still, we may cite, in passing, the formidable work of the Harecastle Hill tunnel on the Trent and Mersey canal, the works across Sale Moor Moss for the canal to Runcorn, and his crowning triumph of the aqueduct that carries the Duke's canal over the Irwell at Barton Bridge at a height of 39 ft. above the navigable Irwell. His employer overcame difficulties of another kind; he had for coadjutors the brothers Thomas and John Gilbert—the former the founder of the Gilbert unions and for a while Lord Gower's steward at Trentham, the latter his agent at Worsley. But for some period the whole county regarded his projects with incredulity, and the Duke, though potentially a wealthy man, had so low a credit that he could not cash a 500*l.* bill at Liverpool. With a single-hearted devotion to his cause he reduced his personal expenses to, it is said, 400*l.* a year, and placing his resources at Brindley's disposal ultimately reaped his reward even in a pecuniary sense. He could in later days subscribe 100,000*l.* to the Loyalty loan, and return his income to the property-tax Commissioners at 110,000*l.* per annum. During a long period after Brindley's death in 1772 he continued untiring in his efforts to improve a system with which his fame will always be associated. He formed more than forty miles of underground canals with inclined planes from one level to another for lifting coal which still serve for purposes of drainage; and he devoted much time, trouble, and money upon endeavours to establish steam-haulage for the Worsley canal by means of paddle-wheel boats invented by Robert Fulton. The canals, having been taken over in 1872 by the Bridgewater Navigation Company, were acquired by the Manchester Ship Canal Company fifteen years subsequently. A scarce little book (anonymous), published by Lowndes in 1766, contains a highly interesting account of the engineering and navigation of the several undertakings.

The Duke had but indifferent health in his youth; on his return from the grand tour which he made under the tutorship of Robert Wood, the Irish scholar, and archæologist of Baalbec and Palmyra, he kept race-horses, and became a patron of sport. His early abandonment of fashionable life in London and of Newmarket Heath for retreat at Worsley is commonly attributed to chagrin that he had felt constrained, for reasons that in no wise reflected upon the lady in question, to break off his intended marriage with Elizabeth, *née* Gunning, the beautiful widow of James, sixth Duke of Hamilton. He died at his mansion in St. James's, which he bought (and afterwards altered) as Cleveland, formerly Berkshire, House, which had been the residence of Thomas Howard, elevated Earl of Berkshire in 1626, of Lord Clarendon, and of Barbara, Duchess of Cleveland, *temp.* Charles II. In the "Crowle" Pennant are a drawing of the house as in 1795, and a copy of Faithorne's plan of 1658. It was rebuilt in 1847-50, after Sir Charles Barry's plans and designs, for Francis, Lord Ellesmere, and contains the famous collection of "Old Masters" gathered by Francis, Duke of Bridgewater, mainly from the Orleans Collection.*

A PHILADELPHIAN ARCHITECT'S VIEWS ON ARCHITECTURE.

The following pointed and original remarks in regard to the modern position and practice of architecture are taken from a paper read by Mr. W. L. Price, of Philadelphia, at the annual meeting of the Ontario Association of Architects at Toronto, and printed in the published proceedings of that Association:—

"Much of what I am going to say may appear reactionary, but I want you to notice one thing, that the man lost in the wilderness (and we are just a little lost in the wilderness in art matters), if he has not some guiding point, will go around in a circle—at least I am so told. So while the line of progress may be something like that—an upward slope—we may be travelling a line something like that,

believing all the while that we are on an upward course.

And we must not measure the line by what we can see of it; we do not see enough to make one part of it look different from another part at any time. We have to consider a great many outside things; to look at history and experience. To the architect especially that is

* Messrs. Constable will shortly publish a volume, to cost 52*l.* 10*s.*, containing reproductions in photogravure by Mr. Walter L. Bourke of 120 of the finest paintings at Bridgewater House, with a descriptive and historical text by Mr. Lionel Cust, Director of the National Portrait Gallery.

essential. There is only one thing worse in my judgment, than ignoring precedent, and that is following it.

Now I want to take you with me in a little practical talk—we are up against a serious proposition. Having secured our client, the first question for us is, what next? Shall we build around that client our shell or his fitting shell? Now when we stop to think of it, how often are we trying to build the best possible monument to ourselves, and not the best possible house or building for that man?

During a first interview with a client a year or more ago, after talking to him about an hour, he said, I would like to see the house you would design for me, Mr. Price, and I said I would too. Being agreed on that he then said: 'Now I have told you the things that I want, the size of the rooms and the number of them; you know the site, make me a sketch of the house you think will fit these requirements.' I said, 'Mr. ————, I will gladly do that; I can do that, I think, but if you take that design and build it you will be a fool.' And then I went on to say, 'for I do not know you well enough to draw a house for you.' I had not the slightest expectation that I would get that job, but right there I got it, because that man began to see something different in architecture from what he had ever seen before; he began to realise that this was to be his house, not an architect's house merely. Afterwards, sure enough, to show you how the good work took effect, one of the leading finishers of the city went to him and said: "Mr. ————, you are a busy man, you don't want to bother with the designs for the inside of your house; I will refer you to So-and-So—we did the work for him—47,000 dols. worth of interior work, and we did not take up two hours of his time.' This gentleman said, 'Well that settles it, you could not decorate my house or do my interior woodwork because I can see that that is your interior woodwork and not his, it does not fit him.' I simply tell you that to point out that what we have to do if we are going to have real architecture is to make our product more than beautiful, more than fitting to the situation, primarily fitting the man that is to live in it, or the purpose for which it is to be used. That means a pretty savage thing sometimes; it means that if we are going to build a house for a vulgar man, that we must build a vulgar house. It would not be architecture if we did not. It must be better than that man; it must be what that man might be, it must represent that, but unless it has in it some element of that thing which makes him the vulgar man, in my judgment, it is not architecture at all. We are up against difficulties and limitations of that kind, and it does not seem to me to be such a bad thing after all. Fortunately, the vulgar man usually goes to a vulgar architect, so that we need not often be seriously troubled that way. But the fact remains that it must fit the man in some way or other, and I think the most of us (even if we do not analyse these questions of design) naturally tend to draw a vulgar house for a vulgar man. But we must be mighty careful of what we mean when we call a man vulgar. A difference in taste does not constitute vulgarity, or the reverse. My client will say: 'I like this or that house at 49th street.' And instead of falling dead I go out and try to find what it is he likes about that house; very often it is a bay window on the side of it, or it faces this way or that way, or it has some other feature absolutely irrespective of design or drawing that fits the man. If, for instance, you take a man that likes brilliant colours, and set him down as being ignorant and vulgar because you have put two things before him; one good, in low tones that you care for, and one bad in high colours that you loath, and that attracts him because he loves colour, you make a great mistake, for that is not a fair test; you ought to put before him things good and bad in both bright and quiet colours, and you will find ninety-nine times out of a hundred he will choose the good thing. Find out what it is he likes about the bad thing, give him a chance and he will choose the good thing rather than the bad. If that were not true there would be no civilisation; we would have devoluted back into oysters by this time, because we have done so many foolish things and so neglected the laws of nature that it must be some principle in us that seeks the right rather than the wrong, to keep us going at all. As Professor Shortt said to us yesterday, we have gotten away entirely from the mainsprings of the art and architecture of the past, we have come to a time when neither the civic nor the religious is the ideal around which we build our civilisation, but the individual, the domestic. Take all these high buildings with which you gentlemen are wrestling in pain and trouble (and it is a serious trouble), what are they for? After all are they not merely the places that we go to (to get away from as soon as we can), that we may have enjoyable surroundings in our home life? That is the sole object, and while we should make them as little obnoxious as possible, and keep them as quiet as possible, because they tend to ramp and rave—while we should do that, it seems to me that our greatest effort should be put upon the making of the object of all this beautiful, and that is, after all, our homes. Therefore, I am talking mainly about house design. I want to say, though, that your President yesterday pointed out what seems to me the only logical materials in which to design the office building, and that is a skeleton of steel clothed with a plastic material of some kind. I cannot conceive, though I admit I have done it myself, that it is proper to clothe a steel frame by putting brick or stone around it, or any real building material. It is a lie on the face of it, for it would not stick there and stand unsupported. If we must have that kind of building, let us encase it with some plastic material like cement. The engineers are looking after the bones, and we are, after all, only the planners and decorators of it.

The most serious question, as I see it, in designing a house that we have to meet with, is what shall the concrete thing be made of, and how shall it be made? Or, perhaps, how shall it be made, and what shall it be made of? We will treat what shall it be made of first. The material must be moderately cheap. We do not often have palaces to build; we are not working for Gould or J. Pierpont Morgan, but for each other, the average community which we find around us; therefore the buildings which we build must be cheap. They must not, or should not, require any great amount of ornament; and I want to point out that the bulk of the ornament that we use is used purely to get surface, and not for the value of the ornament itself. The pressed brick of good old Philadelphia was so horrible that after we once waked up and got past the marble steps and marble lintels, we flew to the other extreme and brought in the tortured mud (the terra-cotta man), with his substitutes for surface; and we put wriggles all over it to make up this surface—that is what it amounts to, most of the ornament is just that, wriggles—and we smear that over it for no other reason than that we want surface. I do not think that the lack of ornament enters our mind one time in twenty when we put that kind of stuff on. I do not refer especially to terra-cotta, but to all senseless ornament. It is because we are afraid the surface will look flat without the ornament, and that is a mighty poor excuse for putting it on. As I say, texture should be the first consideration, because the bulk of our building will depend for its beauty on texture and on the disposal of its masses, and not on ornament. In the first place real ornament that really beautifies the building is too expensive to spread all over it; and in the second place you cannot see it if you do so. It becomes merely surface, and here is where fortune favours us, as it so happens that the cheaper and rougher materials naturally have the better textures. I remember when building a house some years ago, I arrived on the scaffold just as the bricklayer was starting to build a high kitchen chimney—it was my own house, and I could do as I pleased—and he had there two piles of bricks, very nice bricks. One pile was of quite smooth, beautiful bricks, the other pile was of the roughest bricks that he could get. I said, 'What are you going to do with those bricks?' He said, 'I am going to use these rough bricks for the lining, and the others for the outside.' I said, 'Reverse it.' He nearly fell off the scaffold. I said, 'Won't those smooth bricks make a good lining for the flue?' He said, 'Yes, very good, excellent lining.' I said, 'I am quite sure the other bricks will make a much better-looking outside, and that is the part I am interested in, apart from its drawing qualities.' So he put the chimney up wrong side out; and when he had his scaffold down he said to me, 'That is the best looking chimney in this town.' The bricks on the inside cost probably 11 dols. a thousand, and those on the outside 6.50 dols.; and those rough, hard bricks are the only kind, in my judgment, of which to build a country house—the roughest ordinary hard brick that you can get. I will stand fight with a client on that before I will utilise anything else, because it is the brick with texture and colour—the brick that has the burnt head on it—not to be picked into a pattern necessarily, but put there to have its influence on the texture and colour of the building. What is true of brickwork is true also of stonework, with us. When we really want to get expensive stone, then we get Avondale stone, which is as white as the driven snow and as uninteresting as anything in God's creation; or we use rubbed or sawed limestone, and if not satisfied with the surface being perfectly smooth, we specify that it shall be drove-tooled; when it is generally planed on a machine. Whenever they get the chance to put the machine on and make groves, they do it; and all the texture and sense of stone is got out of it. For house-building, the rough stone, the common flat stone that we use down there, makes, in my judgment, the finest wall surface in colour and texture, and interesting light and shade, that we can get. Next comes another material, and, in spite of what our friends who like dark exteriors say, I am extremely fond of it, and that is rough plaster, the roughest sort of dashed work or pebble dash. I think that when we are considering the colour of the exterior, we must remember, as your President said, shadow, the shadow of the eave—make it big if you want to; the shadow of the trees that overhang it; the shadows of the vines that grow on it. What is there more charming, more beautiful, than the white cottages and thatched or tiled roofs of England, with their beautiful vegetation around them? We may, perhaps, consign white to a greyer climate than ours, but much of the time we could stand white, or nearly white, here. And this material, it seems to me, is a very valuable one that is much neglected. It gives us mass, it does not chop the surface up, and it gives us a fine contrast with either stone or brick, whether it be white or coloured. Of course we use a great deal of timber work down with us, and I am sorry to say we very seldom use it honestly, most of our timber work being stuck on the outside of the house and not part of the structure. That, of course, is excusable, there is no possible excuse for it, as far as I can see—I do it myself, but I am ashamed of it and I am trying to stop. It is almost impossible in this country to use it honestly; I doubt if the timbers will stand in our climate long enough when really built in the wall to make it a practical mode of building.

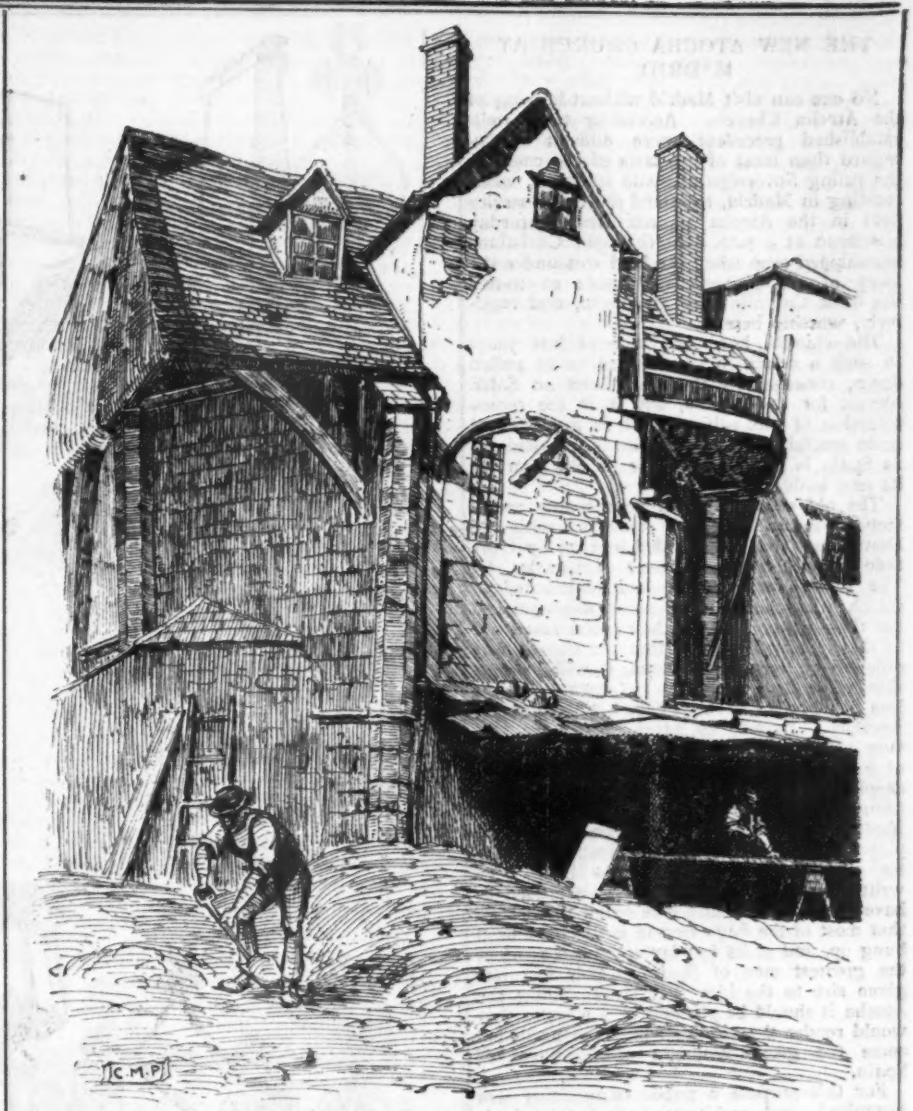
These are, to my mind, the kinds of material that it is worth while to deal with in house-building. . . .

Perhaps the most serious problem we are up against is, how to get this material put together so that it may properly be called architecture after it is done. How much of the building that we are doing in this country would we walk out of our way to see in the old country; or would we collect pieces of as we do pieces of the old buildings? That comes back to the proposition of my friend that the architect is not a designer of buildings, but a designer of opportunities, and, if we cannot find the people about us who will seize these opportunities and together with us make architecture, the net result will not be architecture; we will have design, but not architecture. Here is where I am going to get 'reactionary' in trying to go on straight. People say that we are in a condition, and always have been, of evolution, and that we cannot fight against tendencies. But we know how mankind has evoluted in the past, it has been in spirals. When they were rebuilding a brick Rome in marble, they little thought that Rome was in its decline. Their literature, they thought better than the more rugged and tough literature of former days; their architecture they thought better, more refined, and elegant; but just the same, Rome was in a decline and not on an ascent. It seems to me that it is worth while for architects especially to see what can be done in stemming the tide, or at least in diverting the tide, from methods that are suicidal as far as art goes. You must remember that though the body of architects is a very small one compared with the community, it has been a very efficient mover of the community. The differ-

ence between the Philadelphia—I speak of Philadelphia because it is my own place—of thirty years ago and of to-day, is almost entirely due to the few architects who have worked for better things there. They insisted, and insisted again and again, in spite of the conservatism of client and builder, that material and design should be better, and they have bettered them. Now it is in our hands very largely to influence the men who do our work, by continually insisting on honest work. The men who erect our buildings are divided into two classes—the contractors, with whom we come in touch, and the men who actually do the work. The contractor has, in a large measure, ceased to be a builder; he is simply a contractor; he gets a number of sub-bids, adds them together, and puts on his commission for profit and superintendence, and finances the job, and, to a certain extent, sees that it is carried out—that the people working under him to carry it out. But he has comparatively little touch and little sympathy with the actual workmen who carry out the work, and they are the men that we must go after. It is not the contractors who have much to do with the actual building, it is the craftsmen, if you can call them that, who do the work.

Now, it seems a reactionary proposition, and possibly a hopeless one, to fight against the machine. Here we are at the end of the nineteenth century, the century that brags more of its methods of production than any other one thing; and I say that those methods of production are themselves absolutely immoral and reactionary. And I mean it. I mean that the method of production that considers only the amount of the product and the profit that can be made upon it, is absolutely immoral, and that the products of these methods are essentially inartistic, especially in our decorative friends' materials. I know, for instance, what it is to try to select papers for other people; I know that always, or nearly always, when the people get the paper on the wall they will come into the room and say: 'That is not the paper I selected, it was not that colour, it was not that design.' There is a difference between the design, which may be very beautiful, and the thing you get upon your walls, wherever it is mechanically made. And that is an essential difference. It is a difference that is bound to exist. I do not care how far you may perfect your methods of production, if they are mechanical the result cannot be artistic, because art is, after all, as far as I can see it, only the expression of one's own individuality. Hubbard has said that art is the visible evidence of man's joy in his work. And that is almost a definition, but it is not the real definition, because the art is in the doing of the thing, and not in the product of the doing. You cannot, if that be true, get art material or art results without artists. The proof that it is true is that the artist never hoards the things that he makes; his real joy is in the making. The rich people do not possess the art of the country, they have the crumbs that fall from the artist's table, and that is all that they can get of it. The artists are the fellows that get the fun out of it. Art truly is to the artist. Now we architects are only half artists, because while we guide the hand we are not the hand. It is a pity, but it is true. And yet we have the biggest opportunity in the world, and that is the making of ourselves and the crowd better men at the same time, and it is in our hands to do it. We may be really leaders, but the evidence of leadership is a following. If we have not a following among the people that create the things that we are supposed to create, then we are in nowise leaders; but we have the privilege of being leaders and educators of the people, and especially educators of our co-workers in making architecture. And how shall we go about it?

This machinery question is a vital one, and one we cannot ignore—as to where we can draw the line on the machine. I was trying to make a distinction, and I think I can make one. I think you will agree that the place where we can draw the line is this—just so long as a machine is a tool with which a man works, it is a benefit, no matter how highly it may be developed; but the moment it ceases to be a tool, and becomes a mere automatic machine into which material is fed, and out of which the product comes without any volition of the man who is working it, then that machine becomes an immoral affair, and the product of it becomes absolutely worthless as far as the art world is concerned. That seems to me to be the place to draw the line. That does not cut out band-saws or turning lathes, or other power tools, but it does cut out much of the work we have to put up with; for instance, it cuts out machine carving in all its forms. It is an easy way to make a yard, or a yard and a half, or a whole piece, of so-called ornament, but of what value is such ornament? Now can we get the people we build for, and the people we build with, to go with us, and return—if it be a return—towards a more simple method of construction? I think we can. I think that there is one way we can do it if no other, but it would be a drastic method. That would be to cut off all the ornaments, make the thing absolutely simple and plain, with only the essential features in it. Then, at least, there would be no bad ornaments in it. I think we can go a step further, and instead of cluttering up the inside or the outside of our houses with numberless mouldings and brackets, and 'the Lord knows what, of round and square, stuck here, there, and everywhere,' without any special meaning except that our ancestors or forefathers did it in marble or some other material, for I am afraid that is the reason we put most of those things in, we can eliminate most of these things, and substitute for them extreme honest simplicity in construction, and a little bit of good carving, for we still have the carvers left to us, and some of the carvers and decorators are really artists and artisans. I would rather have on my wall a patch a foot square of real decoration, interesting enough to go and look at twice, than to have the room covered with decoration that has no interest except as to design. That seems to me a most practical line of elimination. Cut the quantity of it down to the quick, if need be, to get the quality a little where we want it. We can do that, and the people will go with us, for they are just as sick of the uninteresting wall papers and truck that their houses are cluttered up with, as we are. I have had no difficulty in getting people to allow me to simplify their houses for them. The tendency to ornament comes from the architect rather than from the client, almost every time. Of course, there are exceptions, and people want a lot of gaudy ornamentation and display; and I think in these cases we had better give in to them. I think that is possibly the best way to cure them. It is a little rough on us, but I think we had better suffer if we can make architecture possible in the doing of it."



A Bit of Mediæval Oxford. From a Sketch by Mr. C. Maresco Pearce.

A BIT OF MEDIÆVAL OXFORD.

THIS sketch, made by Mr. C. Maresco Pearce, shows a bit of mediæval work which was recently brought to light in pulling down the old houses that surrounded it to make room for the new buildings of Hertford College. It stands on the line of the old city wall which still exists round New College, 100 yds. or so away. It is believed to have been a chapel in connexion with the gate at the end of Catstreet, which runs from the High past the east end of St. Mary's to the Broad, which was outside the line of the walls. There is a small, but very good, Perpendicular doorway on the street side.

Mr. Pearce adds, "I understand that Mr. Jackson is going to incorporate the building in his new building for Hertford, but I am afraid that this will necessitate its being practically rebuilt, as it is in a very ruinous state."

COTTAGE HOSPITAL, TREDEGAR.—The laying of the foundation-stones of the cottage hospital which is being erected in Bedwellty Park, Tredegar, took place recently. On the ground floor will be a ward for nine patients, two private wards, an anæsthetic ward, nurses' and doctors' apartments, dispensary, and all the usual offices. The upper floor will comprise accommodation for the staff. The contractor is Mr. D. John Vaughan, Tredegar, the architect Mr. E. A. Johnson, Abergavenny, and the contract price is 2,784*l*.

THE NEW ATOCHA CHURCH AT MADRID.

No one can visit Madrid without hearing of the Atocha Church. According to a well-established precedent, more difficult to disregard than most of the laws of the country, the ruling Sovereign of Spain is bound, when residing in Madrid, to attend the Salve service held in the Atocha Church every Saturday afternoon at 4 p.m. On this spot Christians worshipped even when the land was under the sway of the Mahomedan Moor; so to-day the most Catholic king must also, and regularly, worship here.

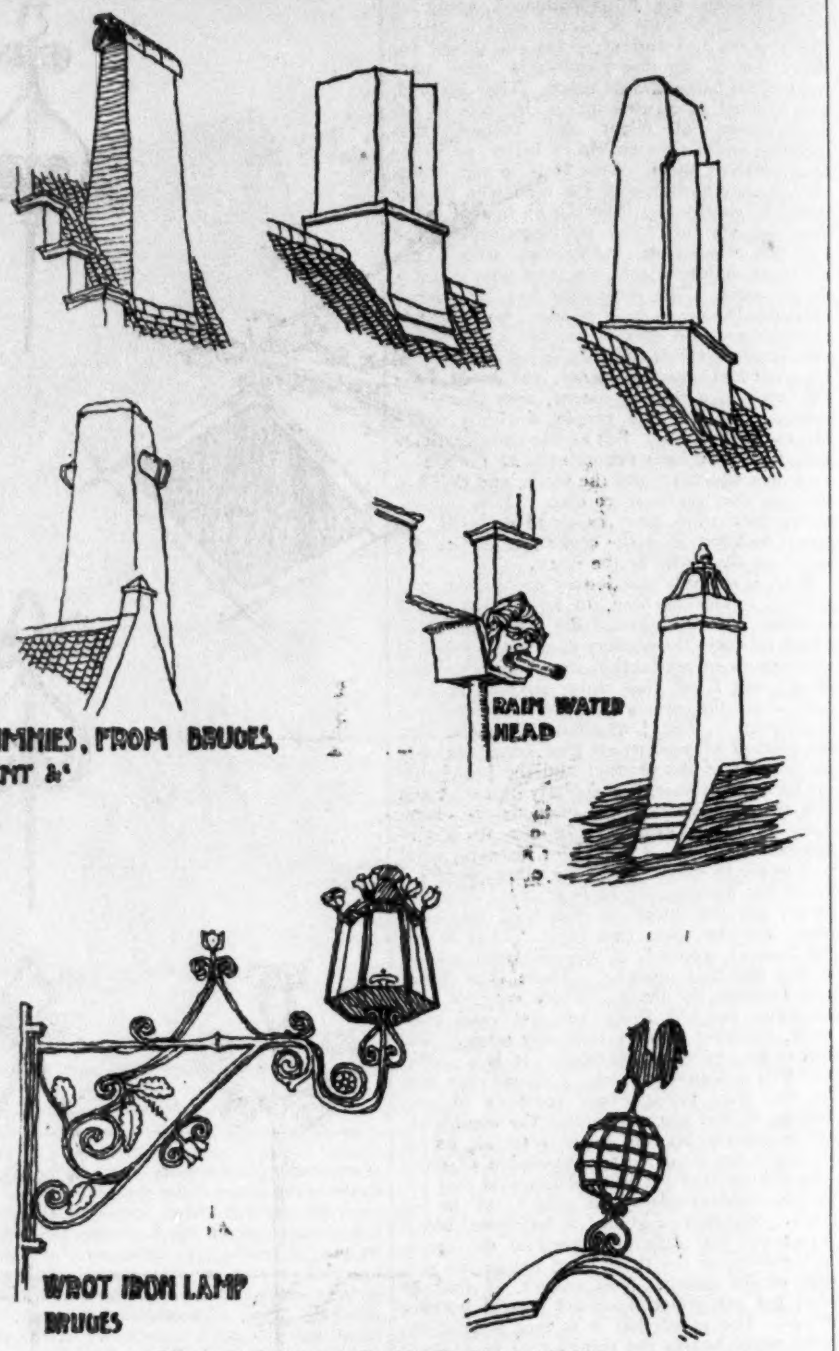
The church, however, came of late years to such a condition that it had to be pulled down, consequently there has been no Salve service for some years, and it is the reconstruction of this edifice which is a matter of some special interest to architects, particularly as Spain is better known for its old than for its new buildings.

The old church did not possess any architectural merit. It was connected with the Dominican convent founded in 1523 by Hurtado de Mendoza, confessor of Charles V. The various princes who had contributed to enrich this church were more distinguished for their piety than for their good taste. If to this is added the fact that the church was pillaged on several occasions, it will be seen that while its destruction has been no great loss it should not be difficult to replace it worthily. Indeed, no great importance was ever attached to the church itself. What is of importance, and what all pious Spaniards deeply revere and value is the image it contains. It represents the Virgin patroness of Madrid. It is black with age, for it has played an important part in Spanish history for some 800 years. Volumes have been written about the miracles it is supposed to have accomplished; and it is round this image that most of the flags won in battle have been hung up, and at its feet lay entombed some of the greatest men of Spain. This fact has given rise to the idea that in rebuilding the Atocha it should be planned in a manner that would render the new structure worthy to become the great Walhalla or Pantheon of Spain.

For this purpose a public competition was organised, and architects invited to submit designs. Señor Ferdinand Arbos is the author of the scheme which was finally adopted. Señor Arbos is of Italian descent, he is a member of the Royal Academy, and is well-known among the successful architects south of the Pyrenees. He has already built many churches and mansions in Spain. The style of the new building is not so much Spanish as a kind of bastard Lombardic Gothic, showing externally alternate courses of white and grey stone. A cresting of the favourite Venetian form crowns the walls, while the cloister arches are filled with some very badly designed quasi-geometric tracery, which has a gimcrack effect much at variance with the general solidity of the building.

The plan comprises a basilica church, and a monumental tower, besides the above-named cloisters. The tower was built first, and already constitutes a landmark in Madrid, where it can be seen rising above and beyond the Southern railway station. But the building progresses slowly. The fact is that the cost is not defrayed by the State, but out of State property, which, though it does not actually belong to the Royal Family, is nevertheless used or administered by them, and it would appear that the amount given out at a time is not large.

However, the tower is built, and some of the cloisters, and sufficient progress has, therefore, been made to begin the use of the site as a mausoleum of eminent men. The first person to receive this honour was a great Spanish statesman, Señor Segasta. He is buried in the new cloister, and a public subscription is now being made to raise a suitable monument to him. In the meanwhile, the wall near the spot where his remains rest is covered from floor to ceiling with crowns, some of them being very large and beautifully made. Here also the bodies removed from the old Atocha church are being reburied. Thus, to the other end of the cloister containing Segasta's newly made grave the body of General Prim has been brought. This lies inside a beautiful tomb, made of metal and richly inlaid. It was the work of the celebrated artist Zuloaga. The cloisters form a quadrangle, and in the centre there is a small ornamental column. The Marques del Duera, better known as General Concha, has a monumental grave in another part of the cloister, and these are the only three remarkable men as yet buried or transferred to this new building, which will eventually be the Westminster Abbey of Spain. At present, however, it looks very dull and deserted. The church is not yet built, the gates to the cloister are locked, and nobody thinks of visiting the place. Thus, while the glory of the old Atocha Church has departed, that of the new one has not yet come into existence.



Bits from Belgium. By Mr. E. Stanley Mitton.

BITS FROM BELGIUM.

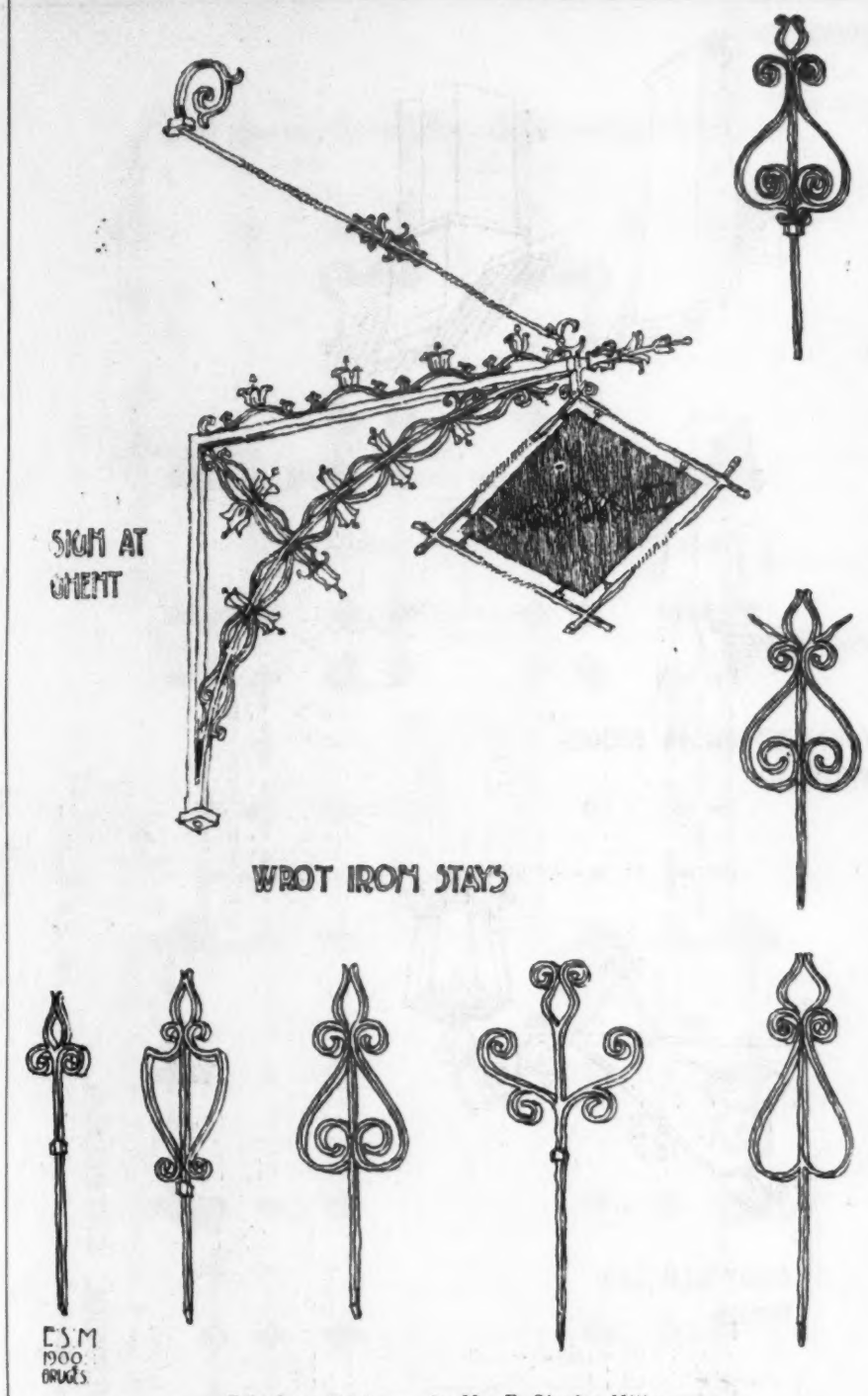
THESE small sketches or notes of bits of detail were taken in Ghent and Bruges by Mr. E. Stanley Mitton, some of whose sketches in Belgium we have previously published.

They illustrate characteristic treatment of iron-work and of chimney terminations.

ALTERATIONS AT BALMORAL.—Sir Rowand Anderson has been carrying out some alterations and improvements, chiefly internal, at Balmoral Castle. The servants' wing has been enlarged and storerooms and bathrooms added. The new work externally is in grey granite, with symbolical decorative features in the pediments of the dormers. The Royal entrance-hall has been panelled in Scottish pine of the district, and a decorative over-mantel of the same material has been erected, with a square panel bearing a carved representation of the Royal Arms, copied from the Great Seal of Scotland.

ENGINEERING SOCIETIES.

THE INSTITUTE OF SANITARY ENGINEERS, LTD.—(Visit to the Northern Outfall Works, Barking.)—By permission of the Chief Engineer of the London County Council the members visited these works on Saturday, the 12th inst., about forty being present. The Northern Outfall is composed of three 9-ft. brick barrels, and is known as the high-level, middle-level, and low-level. The whole of the drainage of the north side of the Thames, nearly two-thirds of the total, finds its way into these three main sewers. The high-level starts at Highgate, taking the whole of the North and North-East districts, running through Hampstead Heath, Holloway, Stoke Newington, Hornsey, Highbury, Hackney, and Kingsland, etc., to Old Ford. The middle-level starts at Paddington, and runs through Hammersmith, Oxford-street, Holborn, Clerkenwell, Old-street, Bethnal Green-road, and joins the high-level at Old Ford. The low-level starts just outside Chiswick, runing through Fulham, Chelsea, along the Embankment, follows the river to Shadwell, then branches off towards Bow Common, through Bromley to Abbey Mills, taking all the low-lying districts and the East End. The high and middle levels come direct to Barking by gravitation, but the low-level is pumped twice; at Pimlico, which is known as the Western Pumping Station, and again at Abbey Mills, where it is raised 40 ft. From Abbey Mills it comes in an unbroken line direct to Barking. The sewage is then treated with lime



Bits from Belgium. By Mr. E. Stanley Milton.

and proto-sulphate of iron, 5 grains of lime and 1½ grains of proto-sulphate of iron to one gallon of crude sewage. It then flows along and passes into precipitation channels (of which there are thirteen, each 40 ft. wide and averaging 1,000 ft. long), over a weir wall 8 ft. 6 in. high, during which time the sludge settles at the bottom. After running for a number of hours, say between 90 and 200, according to weather conditions, the penstocks or valves are closed, and the sewage is allowed to find its level with the weir wall, and the water that is left is drawn off by telescopic weirs, which are really open cylinders, worked by hydraulic power (these weirs being lowered very slowly to avoid stirring up the sludge). The water or effluent runs away through these, and meets the water that has already passed over the weir walls, and runs into the river Thames at any state of the tide. The average daily flow is 130,000,000 gallons. The sludge that remains is passed through screens to separate anything contained in it that would be likely to choke the pumps, among the articles found being:—Brushes, tops, balls, sticks, rags, clothes pegs, etc. The amount of screenings is about 90 tons per week. It is then pumped into settling beds, where it is allowed to stand for 24 hours for the purpose of taking off more water (called liquor), which is too black to run into the river and too thin to send to sea; the reason for this is to lessen the percentage of moisture contained in the sludge sent to sea, generally about 9 per cent. The water that is drawn off in this way is pumped back into the sewers, and is treated with an additional quantity of lime and iron—lime, 10 grains, proto-sulphate of iron, 3 grains. The sludge that remains is sent to sea in ships (there are six steamers, each carrying 1,000 tons, and they make eleven trips a week each; this is for the two outfalls (Northern and Southern), which go to the "Barrow Deeps," where they discharge while turning round, usually over a distance of about ten miles. The amount of sludge sent to sea last year from the Northern Outfall Works averaged 31,000 tons per week.

SOCIETY OF ENGINEERS.—A very interesting visit was made by the President (Mr. J. Patten Barber) and members of the Society of Engineers, on Wednesday, the 23rd inst., to the electricity generating station and one of the baths and washhouses at Islington, by permission of the Islington Borough Council.

The electricity works are situate in Edengrove, Holloway, at the side of the Great Northern Railway, and in a position that is practically the electrical centre of gravity of the Borough. The system adopted for supply is high-tension alternating, with street tank transformers as sub-stations. The works consist of a range of buildings comprising offices, new boiler-house, double-bayed engine-room, old boiler house, stores, workshops, and auxiliary plant-room, yard and mains, workshops, and cooling tower. The offices have been arranged to come between the works and the Catholic church of the Sacred Heart, which lies south-east of the works and adjacent to it. Coal is rail-borne, and delivered on a private siding from the Great Northern main line. The siding is continued through the works, and, by means of permanent ways over the coal bunkers in both boiler houses, railway waggons can be lifted and tipped directly into the bunkers, a special tipping-gear being provided for the purpose.

The boiler-houses are excavated so that the firing floor is about 13 ft. below ground level. They contain (old boiler-house) four Babcock and eight Lancashire, and (new boiler-house) six Babcock boilers. The steam pipes are arranged so that the boilers are coupled direct to the engines, and by means of an equalising range any boiler can be connected to any engine, or the whole system run together. By this means the large steam rings formerly favoured in electricity works have been avoided, and the condensation losses reduced.

The engines consist of Wheellock cross-coupled compound, run at 95 revolutions, with a steam-chest pressure of 125 lb. to 150 lb. per square inch. There is also a combined engine-driven motor generator, consisting of Reavell high-speed 80 h.-p. engine, Crompton 40 k.-w. high-pressure alternator, and Crompton 20 k.-w. dynamo used for charging cells, and day plant.

The switchboard is situated on a gallery which is extended across a portion of the width of the engine-rooms at one end, and along the engine-room down the centre so as to command a view of every part. The high-tension machine board is a fourteen-panel Ferranti 500 ampere board, split in halves, with the usual regulating gear instruments, fuses, and synchronisers. On either side are the circuit boards of the Fowler plug pattern, and on the extension gallery is the arc circuit switchboard by Cowan's, Limited. The alternators are run in parallel upon bus bars, and the rule adopted is that speed is adjusted for frequency, steam is adjusted for load, and excitation is adjusted for volts. For street arc lighting there are five thirty-light and three fifty-light rectifiers, with two boards, one of the 1895, and one of the 1902, pattern by Ferranti, and five alternating series, constant current transformers.

The street lighting now consists of 473 lamps made up as follows:—Four circuits with a maximum of thirty lamps each, 12 amperes rectified; two circuits with a maximum of fifty lamps each, 10 amperes rectified; six circuits with a maximum of thirty lamps each, high-tension constant pressure alternating with transformers in base of each lamp post for the individual lamp; four circuits with a maximum of thirty lamps, constant current series alternating with compensators in the series circuit, and across which the lamps are connected. For side-street lighting experiments have been made with the Reason Company's, the Improved Electric Glow Lamp Company's, and Nernst fittings.

The distributing system in the past has consisted of cast-iron pipes containing double concentric rubber insulated steel-armoured cables as high-pressure feeders and distributors, also vulcanised india-rubber double concentric steel-armoured cables drawn into 3-in. earthenware pipes. Extensions are now being laid with paper insulated twin arc cables, double concentric paper insulated high-tension feeders, and triple concentric paper insulated low-tension distributors, all laid on the solid system.

The meters in use are:—Chamberlain and Hookham, Hummell, Guttmann, Westinghouse, British Thomson Houston, Aron, Stanley; and Reason demand indicators are fitted where the sliding scale method of charging is adopted.

METHODIST NEW CONNEXION CHURCH, WALLSEND.—The foundation-stone of the Methodist New Connexion (Allan Memorial) Church, Park-road, Wallsend, was laid recently. The new building will be in the Gothic style, and will accommodate 500 persons. It will be of red brick, with stone dressings, and will have a red-tiled roof. There will be a transept and organ chamber, and on the north-west corner a tower and spire. There is to be a commodious gallery, and the total cost is estimated at about 6,600*l*. The contractor is Mr. W. T. Weir, of Howdon, and the architect is Mr. B. F. Simpson, of Newcastle.

Illustrations.

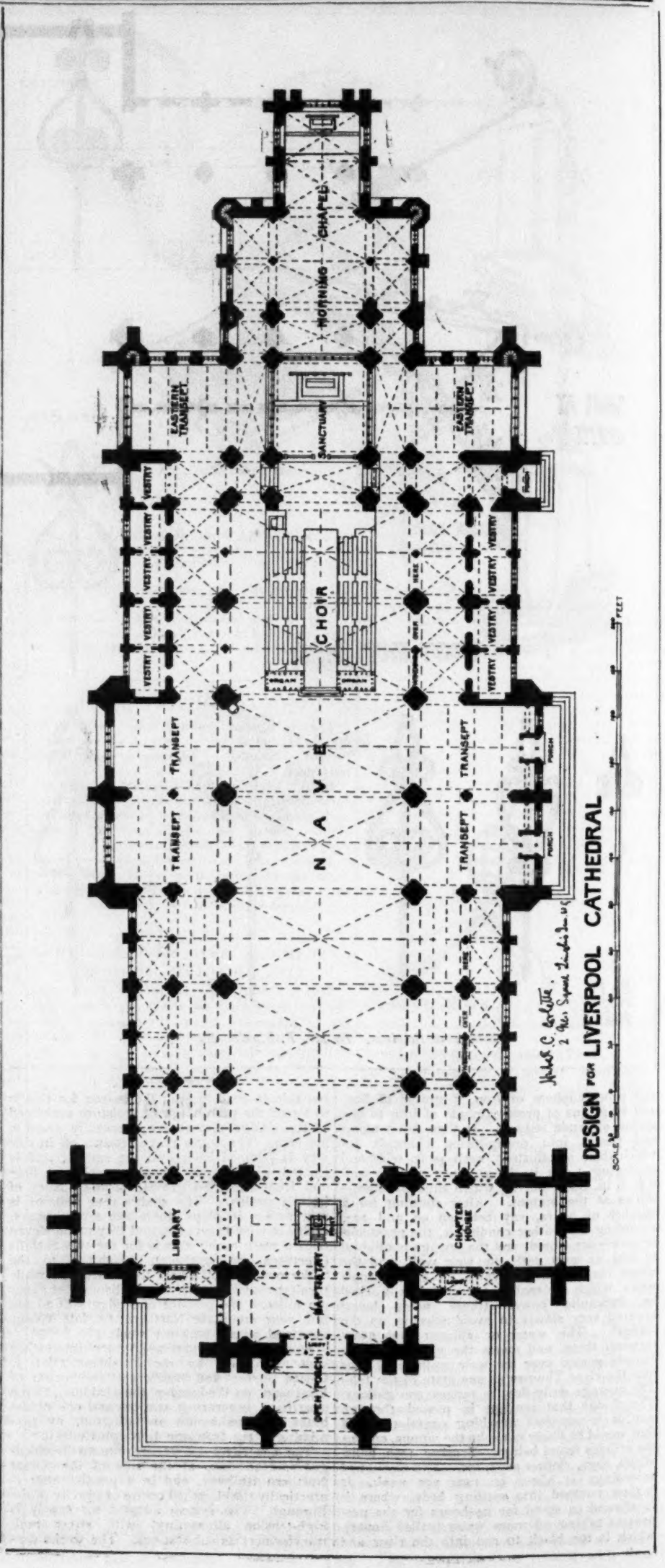
COMPETITION DESIGN FOR LIVERPOOL CATHEDRAL.

IT was intended in contriving this plan of a cathedral that by its internal arrangement and external composition it should express the facts of which it should be a visible symbol. It was to show the relative importance of the several parts of the building.

In planning a church it is manifest there are some fixed ideas to be embodied in the structure. These are:—The altar must be protected with reverence, guarded by dignity, and respected as the central object in the building. This being so, the architectural scheme should depend upon it, lead up to it, and emphasise its chief importance. Next:—The building is a place set apart for worship, for praise, for teaching, and the font must be provided for. This clearly means, (1) that the importance of baptism must be shown by the position given to the baptistry in the arrangement of the plan; (2) provision should be made for housing a congregation, and a place is to be set apart for (3) those whose duty it is to lead the praises and (4) offer the worship of the church.

The plan attempts to work out these ideas in one of many ways which might have been used. The dominant feature of the whole building rises above the sanctuary, which is thus separated, as something which stands alone among the elements of the group. The choir is in the nave, but connected with the sanctuary; and in order to break the vista, though not obstruct the view, the organ is put at the west end of the choir, and helps to give to it some architectural importance. Its size, and the small details of the woodwork and metal in its design, were intended to give scale to the great nave. The latter is 72 ft. wide between the piers of the nave arcades, and 120 ft. between those of the aisle arcades. It is 350 ft. long from the west wall to the sanctuary arch, and 130 ft. high. The piers of the nave arcade are 40 ft. from centre to centre, and 30 ft. clear span. These piers are carried high up, so that the apex of each arch is only a few feet lower than the central vault over the nave; and each arch of the great arcades, in three of the bays, is carried out as a pointed barrel vault till it stops against the outer wall of the building carried over the aisle arcades. In the case of the west transept, the central double transeptal bays, and the east transept, the barrel vaults run out to the outer walls. But in the two bays above the choir no barrel vaults occur; the large arcade is sub-divided at a low level, and the windows giving light to the choir are brought in close to the choir stalls, and placed in the wall under the great arches of the main arcade. The windows of the three barrel-vaulted bays of the nave are in the wall above the aisle arcade. The outer walls of the western and eastern parts of the nave are thus in different vertical planes, so that the lighting would be varied throughout its length. The transverse and diagonal ribs of the nave vault were to be stone, with a light concrete domed filling between them; and the decoration suggested was to be done in tempera directly on the filling, without any plaster surface decoration, except where a slight emphasis was introduced by modelling the decorative lines of colour upon the vault.

H. C. CORLETTE.



WOOD GREEN, ST. PAUL'S CHURCH.

THIS church is to be built of stock brick externally, with stone dressings. The interior is to be finished with plaster as a basis for decoration, and stone as shown.

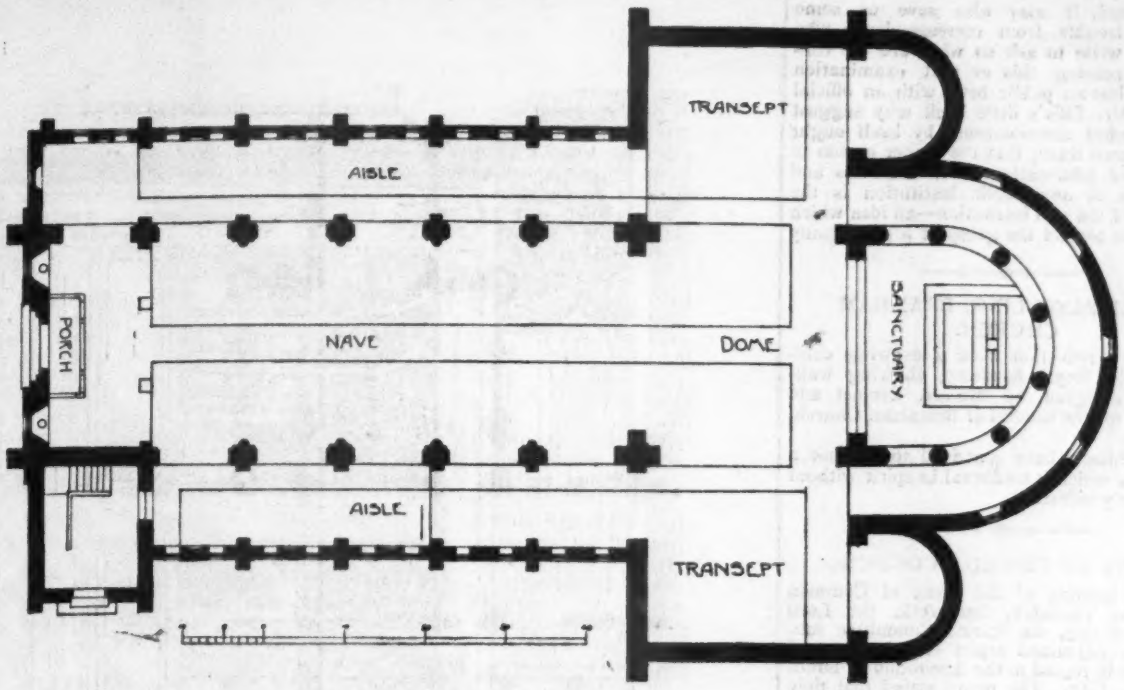
The dome and apse vault are to be of concrete, and these it is intended to finish with glass mosaic. All the other roofs are intended to be painted.

The woodwork, except for the roofs, is of oak. The floors in the nave are of woodblocks, and the passages of tiles, and the sanctuary of marble.

Mr. E. Goldie is the architect. The drawing was exhibited at this year's Royal Academy.

ST. MARY'S CHURCH, YATE.

THE tower of this interesting church was erected late in the fifteenth century, and was



Church of St. Paul, Wood Green. Plan. [See preceding page.

probably left incomplete at the Reformation. The existing stones were, however, so completely finished that no doubt was left as to the detail of the upper part, the only matter for fresh decision being the height of the parapet and pinnacles.

The porch had suffered from a churchwarden restoration, the gable being filled with a large window of the period. This filling in of the gable has been replaced by a new design shown upon the drawing.

An Early English timber roof to the porch was discovered under the plaster, and is now repaired and exposed.

The work was carried out by Messrs. Cornish and Gaymer, of North Walsham. The work undertaken comprised the recovery of the roofs of nave, choir aisles, and transepts, all of considerable interest. The church includes work from the Norman period downwards.

Mr. W. D. Caröe was the architect.

CASKET AND GOLD CHAIN FOR THE CORPORATION OF PRESTON.

WE give illustrations of two examples of gold and silver smiths' work, designed by Miss Florence H. Steele.

The first is a casket to contain the Charter of the Honorary Freedom of the Borough of Preston, presented to the Earl of Derby on August 6 last, and the second, a gold Mayoress's chain, commemorative of the courtesy and hospitality of the Earl and Countess of Derby during his tenure of the office of Guild Mayor in 1902.

The casket is in silver, and the arms of the house of Stanley, those of the Borough of Preston, and the Derby monogram and coronet are enamelled on it, giving a balance of colour to the scheme. The inscription plate in the central panel is in champlevé enamel, and behind it is the space provided for the signed and sealed Charter of the Freedom of the Borough. The two figures cast in silver, standing to the left and right of the body of the triptych, represent respectively Justice and Mercy. The illustration shows the casket with the doors closed; when opened, they show the finely-lettered Charter, displayed so as to fill up the framing formed by the casket.

The chain is of solid gold, enriched with pendant, pearls, and opals. The seated figure in front, bearing in her right hand a ship, and in her left a distaff, is allegorical of the commerce and industry of the town. From this ornament depends a medallion portrait in relief of the Countess.

The coats of arms which adorn the chain are those of Great Britain, the County of Lancaster, the house of Stanley, and the Borough of Preston. They are executed in enamels, and give much charm of colour to the design without destroying the simplicity which distinguishes it.

The carrying out of these works from the designs executed in relief by Miss Steele was entrusted to Messrs. Barkentin and Krall, of London.

A SMALL COUNTRY HOUSE.

THIS is a small country house designed by Mr. J. H. Sellar, one or two of whose designs for the same class of building we have before published.

In the plan he has obtained a dignified *suite* of sitting-rooms well shut off, but perhaps with a too great prevalence of south light for all three rooms, which is inconvenient in summer, however agreeable in winter.

The servants' w.c. would have been better at the outside angle, in the position occupied by the coalshed, so as not to have its door so nearly opposite that of the scullery.

GATE-HOUSE AND MASTERS' LODGING, ABINGDON SCHOOL.

THIS is a small house designed to afford under one roof a residence for the porter and a lodging for apparently two of the masters, in connexion with Abingdon School. Mr. Harry Redfern was the architect.

Books.

The Cathedral Church of St. Albans. By REV. THOMAS PERKINS. London: George Bell and Sons. 1903. 1s. 6d.

THIS, the most recent of Messrs. Bell's series of books on the English cathedrals, resembles others already noticed in these columns in general arrangement, the five chapters into which it is divided giving an account of the history of the building, the exterior, interior, the See, and the churches and other objects of interest in the city. The excellent illustrations, chiefly from photographs taken by the author, are an attractive feature, not the least being the few that show the cathedral and some of its detail before the work of rebuilding and so-called repair was begun. Into the merits of this work it is not necessary here to enter, but the author appears to be fully sensible of the destruction of much of its beauty and architectural interest that has taken place. None the less is it necessary to raise a protest against the inclusion of such statements as we find on pages 25 and 72. In the former the author says that the work of the west front "is as good as is most nineteenth-century work," and a similar expression is used on page 72 with reference to the work in the Lady Chapel. We do not for one moment suppose that anyone with a knowledge of the subject will be misled by this statement—it does not even appear as merely the author's opinion; but in a book of this kind, excellent in almost every other respect, such a statement is to be regretted, and its omission in future editions is to be desired.

The recently added panel in the Wallingford or altar screen of Mr. Alfred Gilbert, R.A., is noted in the text, but does not appear in the photographic illustration on page 58. It undoubtedly is very beautiful in itself, but the placing of a representation of the Ascension below that of the Crucifixion has a somewhat incongruous appearance. A scene which which would have led up to the Crucifixion above would surely have been more appropriate.

The great gate is illustrated by a good photograph at the beginning of the chapter on buildings in the city, accounts of Sopwell Nunnery and the three churches also being included. The towers of St. Peter's and St. Michael's have been rebuilt, together with portions of the churches, by Lord Grimthorpe, and a smaller edition of the terrible circular window that is perhaps the greatest eyesore in the Abbey Church has been inserted in the west end of the former church.

The ground plan—unfortunately, like others in this series, a poor one—has a short reference to the shrines and monuments. The reference to the "Wallingford screen," however, has been placed behind the nave pulpitum, and not at the east end of the presbytery, as it should have been.

With the exceptions we have named, the book is well done, and forms an excellent and concise account of a building that is still, in spite of many vicissitudes, one of the most interesting ecclesiastical monuments in the kingdom.

The Candidate's Guide to Examinations and Appointments in the Building Trades. By GEORGE ELLIS. Published by the author at Ilford, Essex. 6d.

THIS is a very useful little book, giving information as to what qualities and acquirements are necessary for adequately filling the positions of clerk of works, building inspector, general foreman, etc.

The first part deals with examinations which can be passed in order to obtain various certificates; the places where such examinations are held, who to apply to about them, and fees required. The second part, under the head "Appointments," shows how to qualify for the class of appointments under consideration, and the best steps to take towards obtaining them.

Such a book should be very useful for those who look to the class of appointments referred

to. If read, it may also save us some occasional trouble from correspondents who frequently write to ask us what are the conditions of passing this or that examination held by a known public body with an official address. Mr. Ellis's little book may suggest to them, what common-sense by itself ought to have shown them, that the proper person to write to for information about the rules and regulations of any public institution is the Secretary of the said institution—an idea which seems to be beyond the grasp of a good many people.

WALL-PANELLING, BRAMHAM CHURCH.

THIS is a reduction from a drawing exhibited at the Royal Academy, showing wall-panelling designed by Messrs. Bromet and Thorman, for the chancel of Bramham Church, Yorkshire.

The architects have contrived to produce a bit of work which is mediæval in spirit without being merely imitative.

COURT OF COMMON COUNCIL.

AT the meeting of the Court of Common Council on Thursday, last week, the Lord Mayor presiding, the Streets Committee submitted an adjourned report on the proposed regulations in regard to the demolition of buildings in the City. The report stated that they had further considered the regulations, together with the suggestions of the Royal Institute of British Architects, the Surveyors' Institution, and the Institute of Builders. The proposed by-laws read as follows:—

1. That proper hoards should be erected and fans fixed at the level of the first floor, and such other portions as may be directed. That before any pulling down is commenced, all windows and other openings in the external walls shall be close boarded in unless a gantry be constructed, and the upper portion boarded in to the full height of the building to be taken down.

2. The roof of any building shall be removed and the internal partitions and cross walls shall be pulled down floor by floor, before commencing to take down any of the main walls of such floors.

3. Canvas or boarded screens, mats, or other suitable appliances shall be used wherever required, and so placed as to reduce the nuisance arising from the escaped dust.

4. Water shall be laid on and constantly used on each floor by means of jet and hose during the demolition of any building, and all materials shall be freely sprinkled with water to reduce the nuisance arising from dust.

5. The ceilings and lath and plaster partitions shall not be broken down, or any rubbish, lime, or mortar shot or allowed to fall from floor to floor, or into any basement, within 20 ft. of a public way, between the hours of 10 a.m. and 6 p.m., except on Saturdays, when it shall be permitted after 3 p.m.

6. No materials arising from the demolition of buildings shall be basketed, wheeled, or loaded into carts, or carted away, between the hours of 10 a.m. and 6 p.m., except on Saturdays, when it shall be permitted after 3 p.m., unless a temporary carriage-way entrance, or draw-in across the footway, has been provided in such a manner as shall prevent any nuisance arising from the escape of dust.

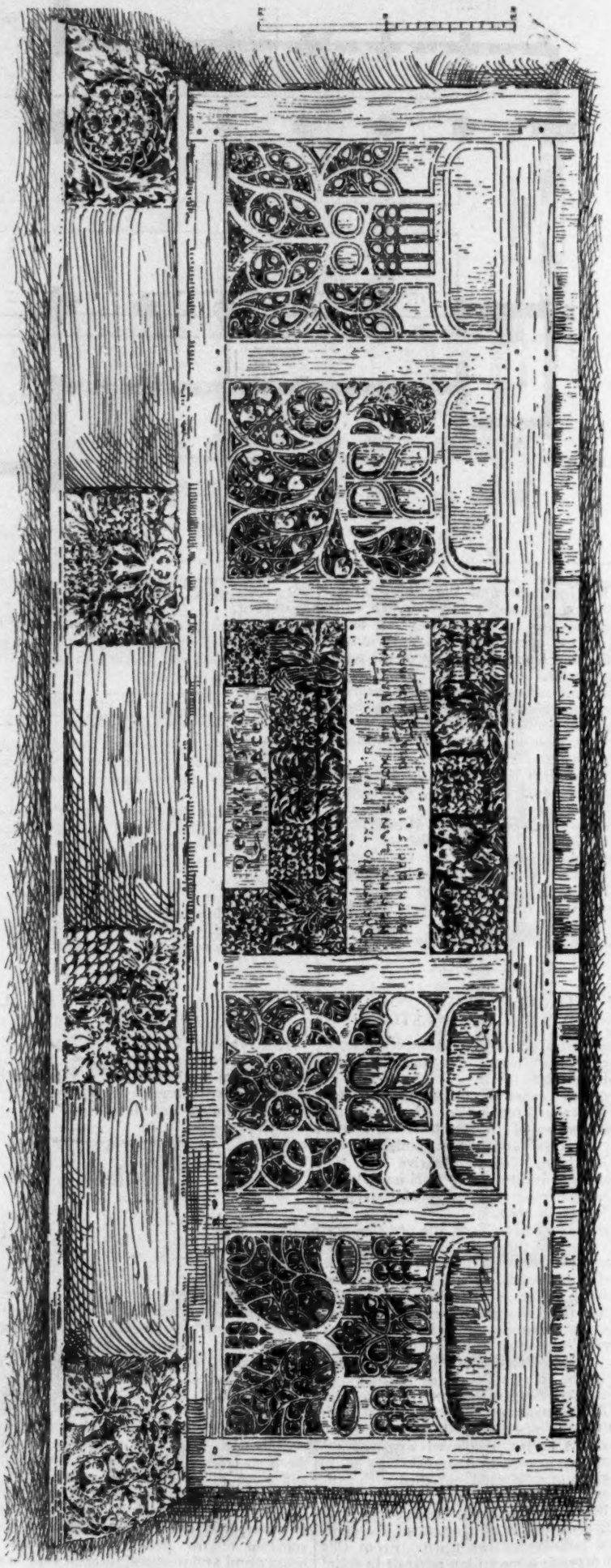
7. All directions of the engineer shall be strictly complied with.

8. Every person who offends against any of the foregoing by-laws shall be liable for every such offence to a penalty of 5*l.* for each breach thereof: Provided nevertheless that the Justices or Court before whom any complaint shall be made, or any proceedings may be taken in respect of any such offence may, if they think fit, adjudge the payment as a penalty of any sum less than the full amount of the penalty imposed by this by-law.

Mr. Deputy Mathews moved as an amendment, "That in clause 2 the words 'and cross walls' be eliminated; that the following be substituted for clause 5:—'That care be exercised in taking down to prevent unnecessary accumulation of dust and débris, and throwing from floor to floor, between 10 a.m. and 6 p.m., except on Saturdays, when it shall be permitted after 2 p.m.'; and '2 p.m.' be substituted for 3 p.m. in clause 6, and that the word 'any' in line 00 be omitted; and that the following be substituted for clause 7:—'That these by-laws shall be carried out under the directions of the engineer.'"

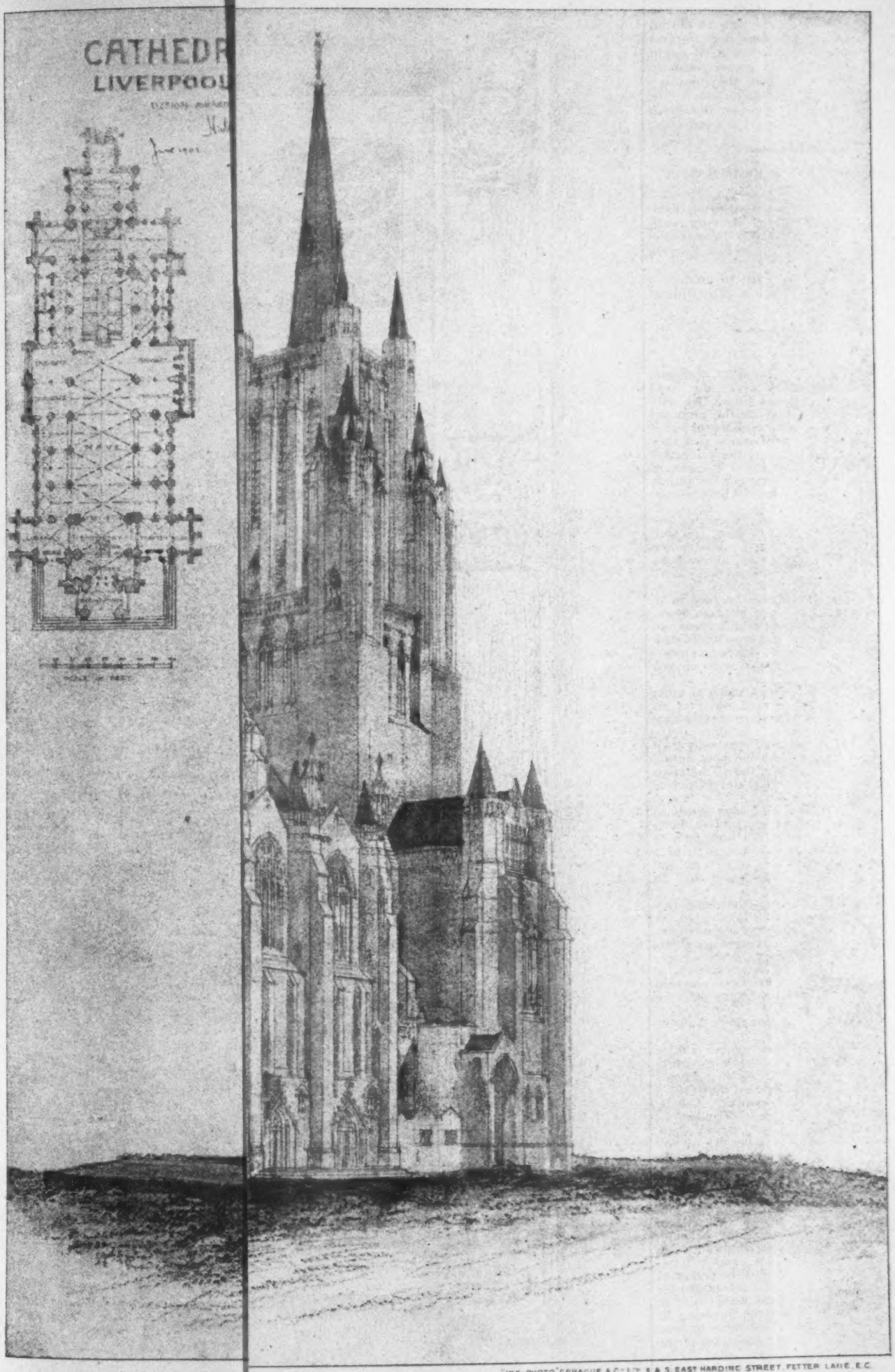
Some discussion followed, which ended in Mr. Deputy Mathews withdrawing his amendment and the whole matter being referred back to the Committee for further consideration.

The Bridge-House Estates Committee presented a report on the proposed re-construction



Wall-Panelling in Chancel, Bramham Church. Messrs. Bromet & Thorman, Architects.

CATHEDR
LIVERPOOL



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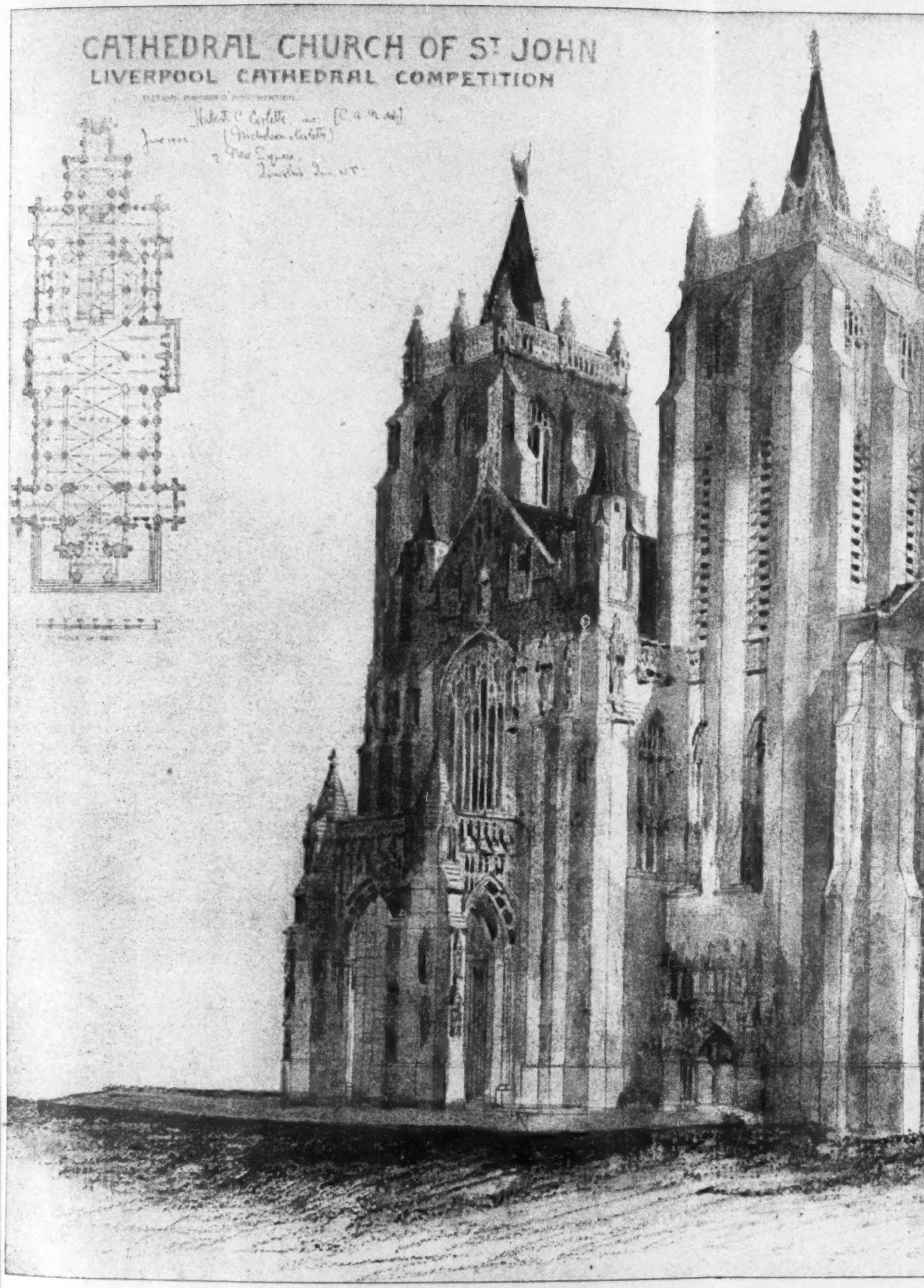
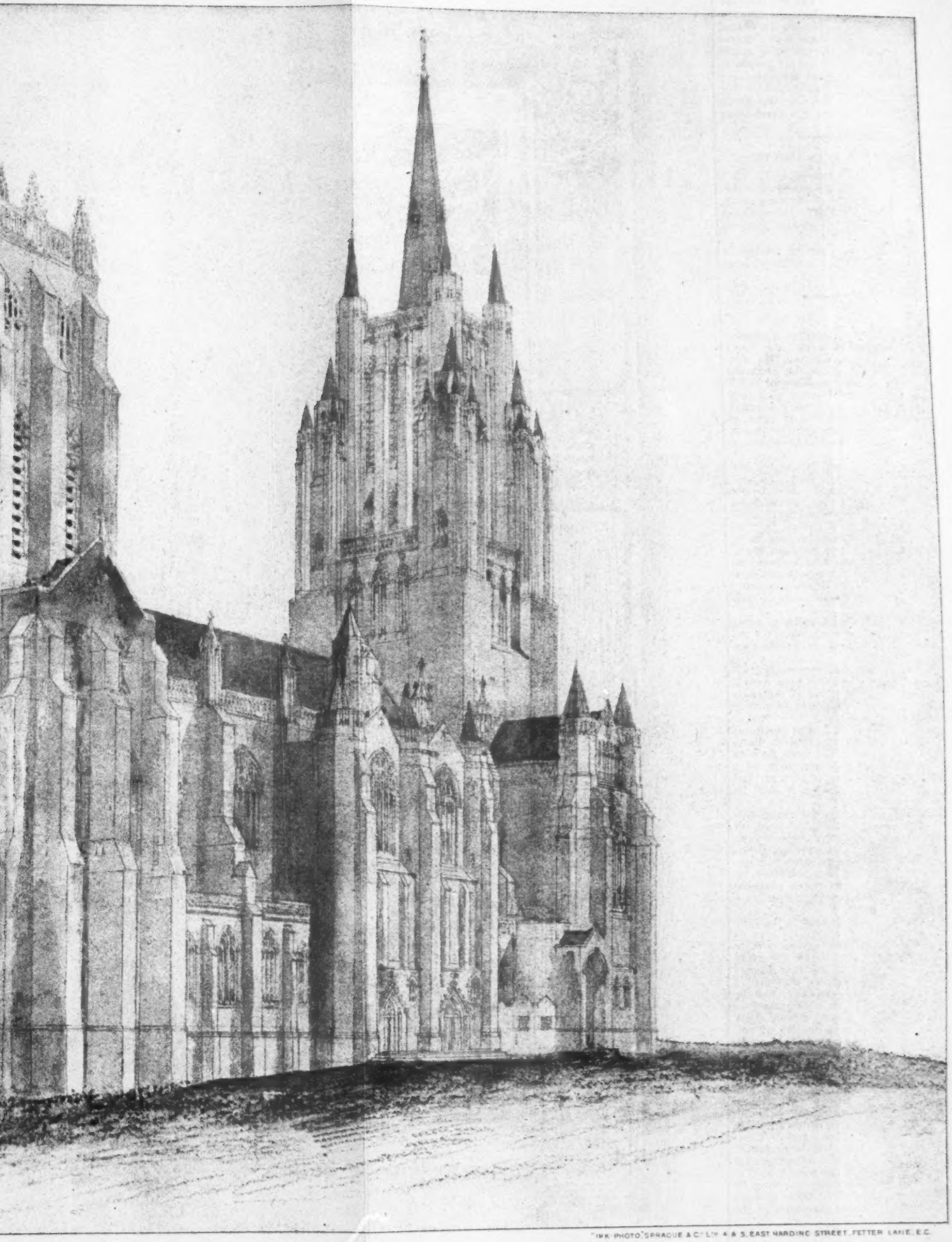
Wall-Panelling in Chancel, Bramham Church. Messrs. Bromet & Thorman, Architects.

CATHEDRAL CHURCH OF ST JOHN

LIVERPOOL CATHEDRAL COMPETITION





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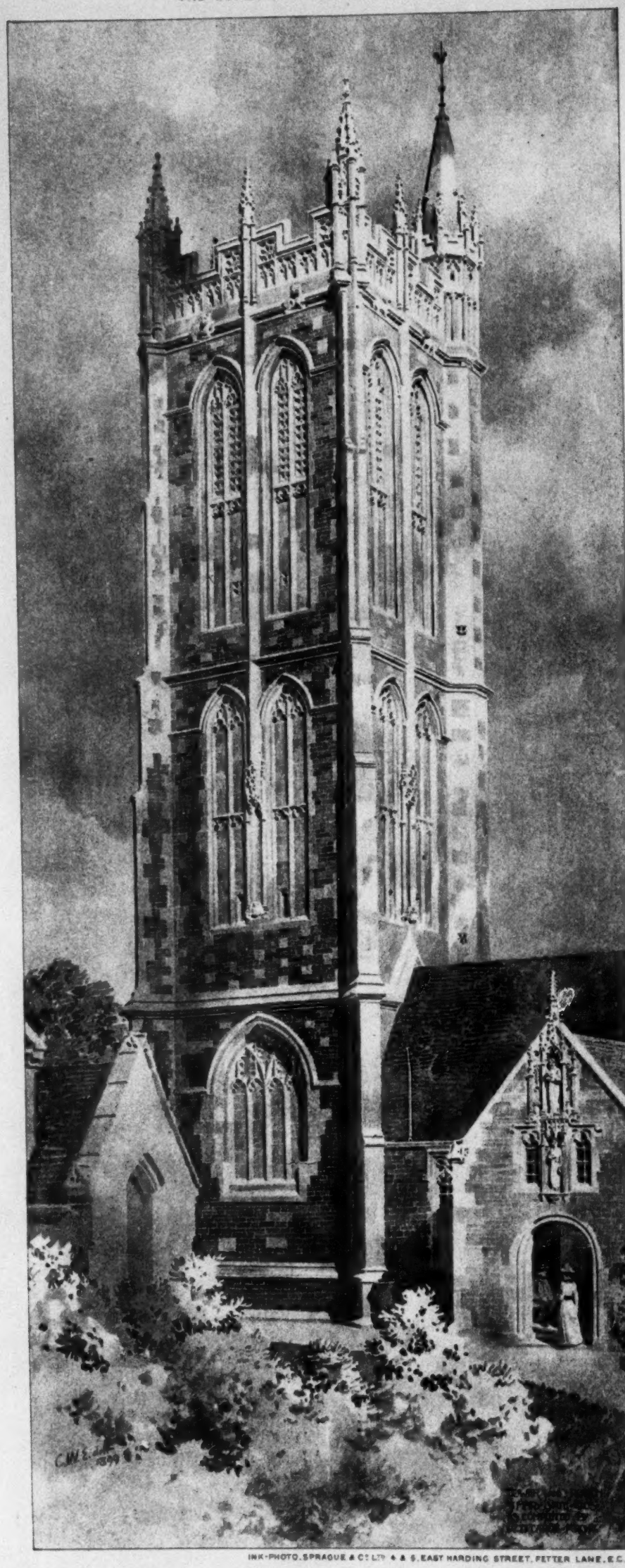
INTERIOR, CHURCH OF ST. PAUL, WOOD GREEN.—Mr. E. Goldie, Architect.



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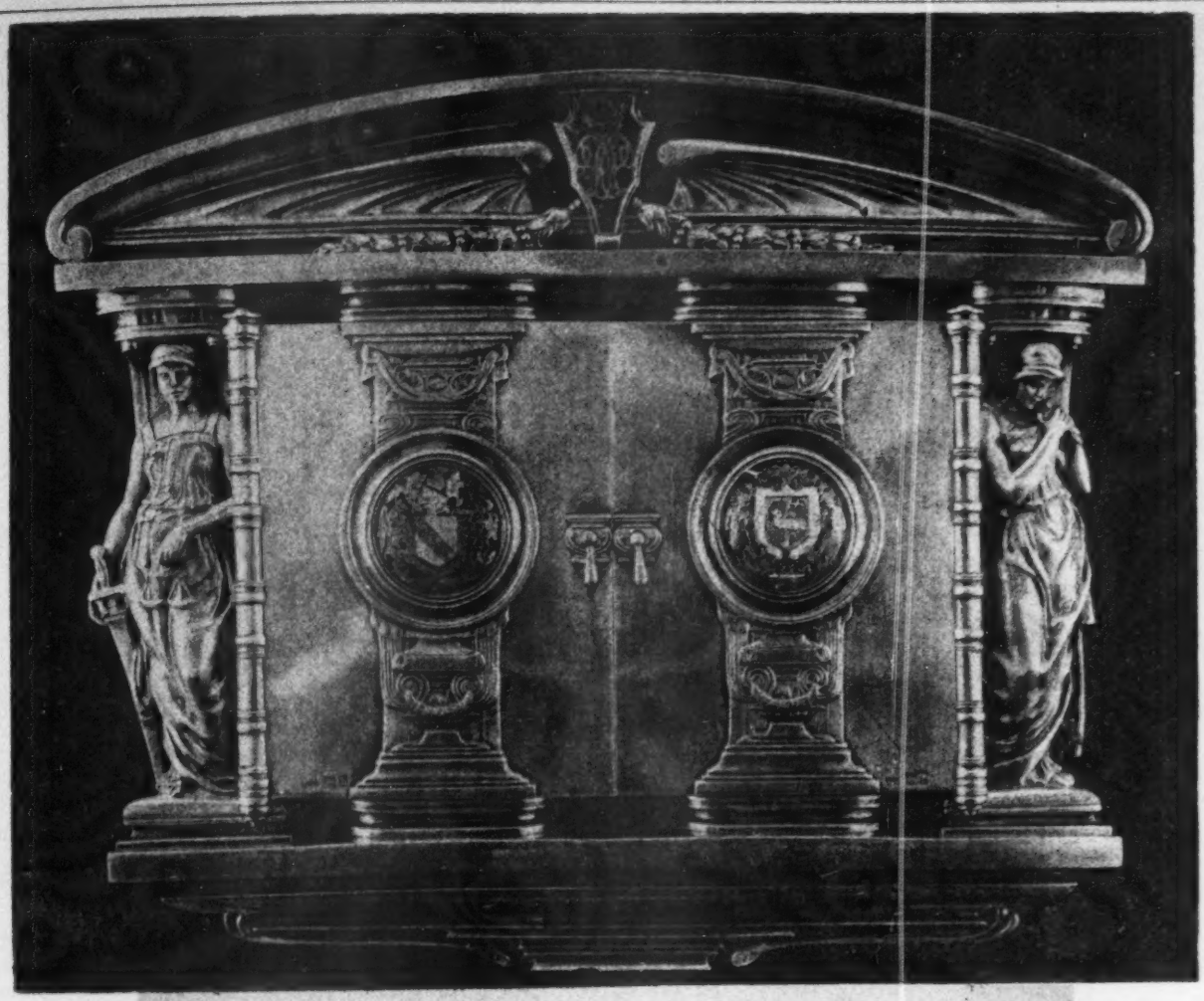

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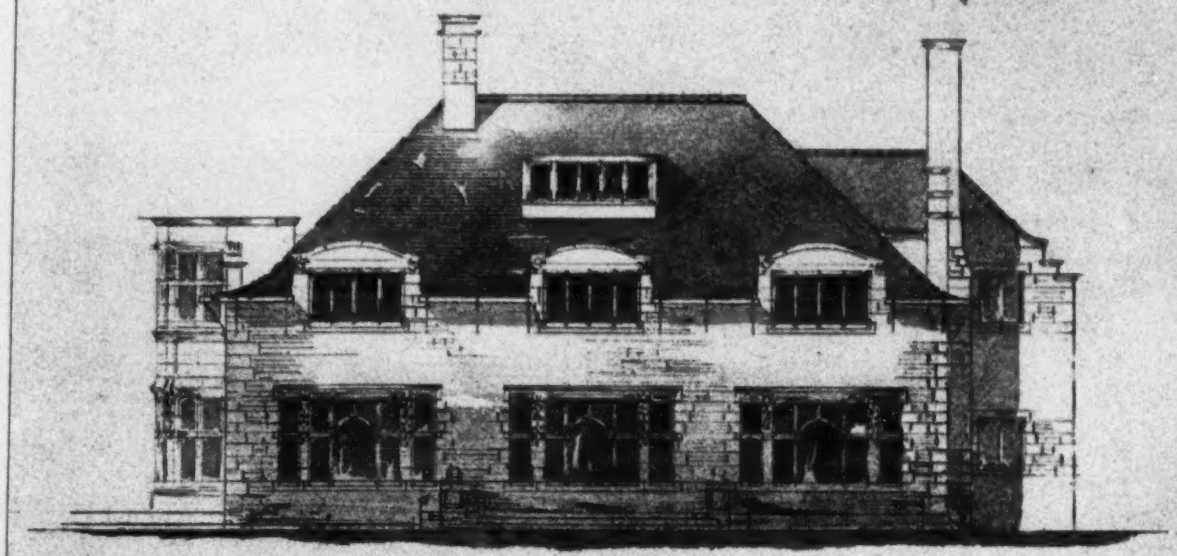
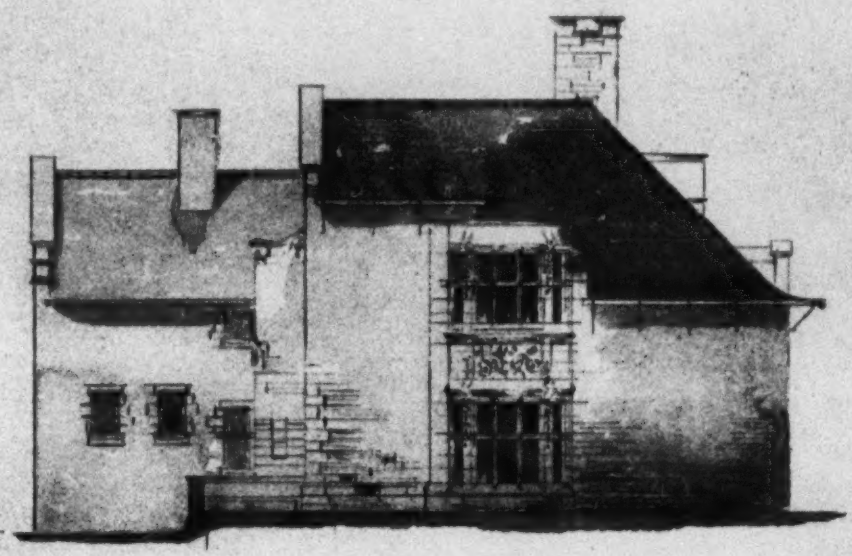
CASKET AND OFFICIAL CHAIN DESIGNED BY MISS FLORENCE STEELE FOR THE CORPORATION OF PRESTON.

A Small Country House

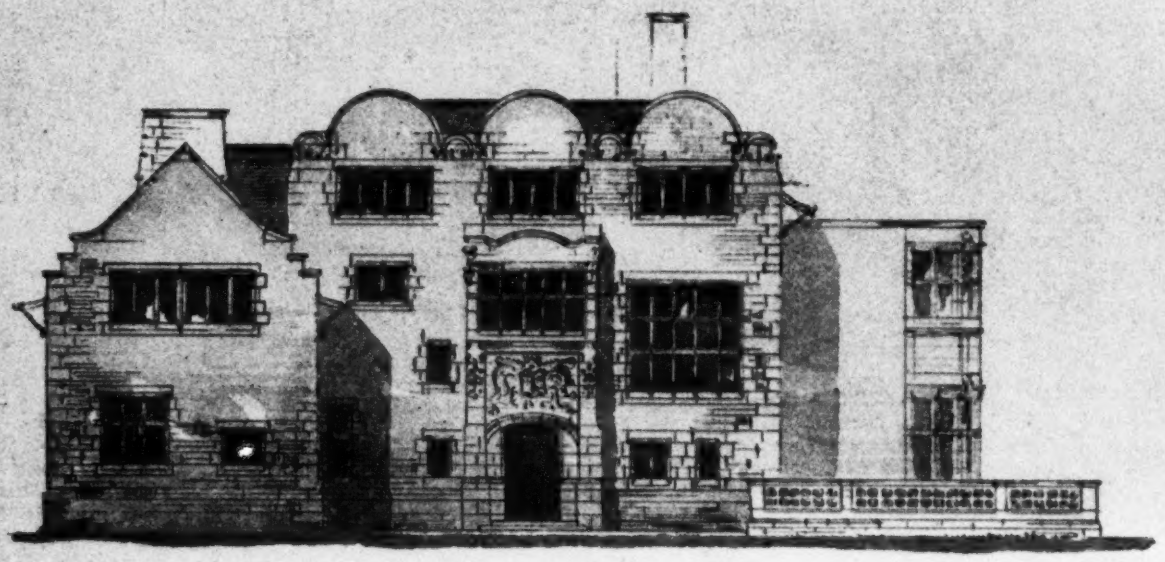
J. Henry Sellers. Architect



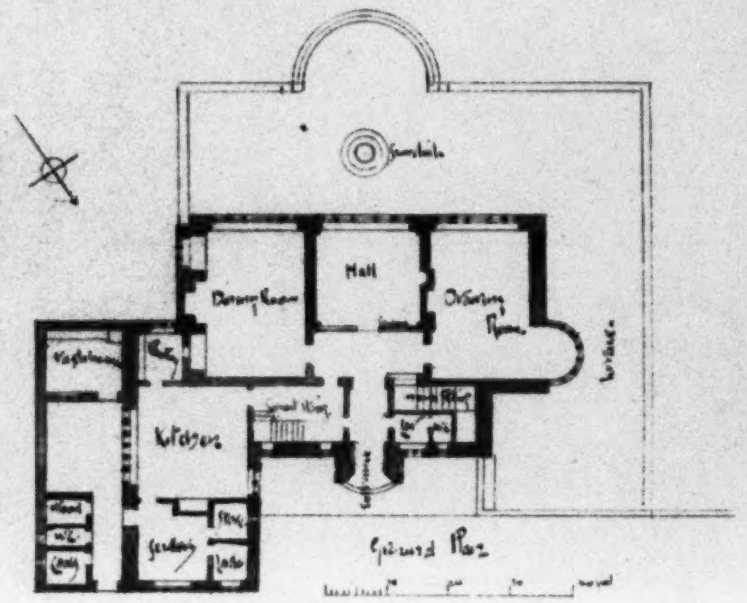
Garden Front.



Terrace Front.



Entrance Front.



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Entrance Front.

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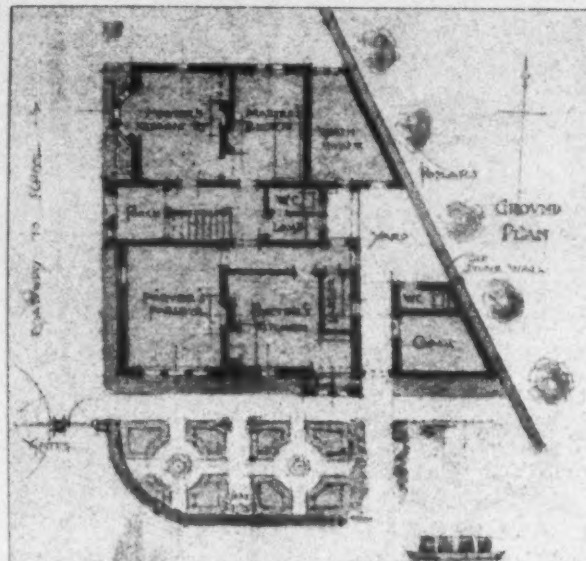
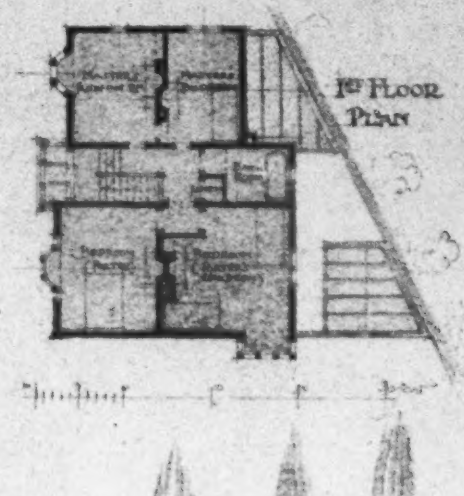
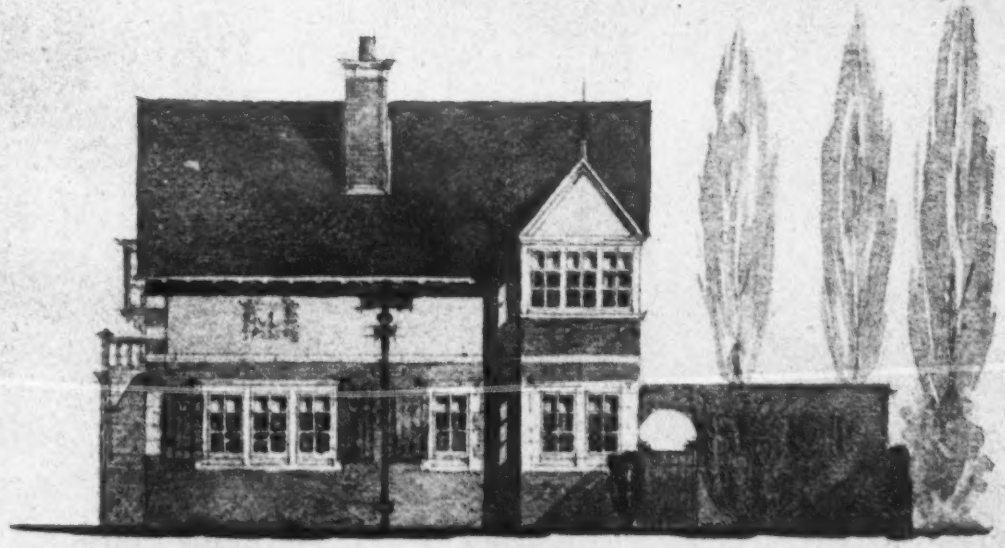
ABINGDON SCHOOL 1563

GATE-HOUSE AND MASTERS' LODGINGS





West : Elevation



South : Elevation

Harry Redfern Archt.

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of Southwark Bridge, recommending the adoption of a design for reconstructing and lowering the bridge between 7 ft. and 8 ft., and raising the level of Upper Thames-street, at the intersection with Queen-street, to a height not exceeding 3 ft. and the neighbouring streets and lanes proportionately), at an estimated cost of 350,000*l.*

In moving the adoption of the report, the Chairman of the Committee said that they had considered a scheme for the improvement of Southwark Bridge by the construction of a viaduct over Thames-street, the cost of which would be about 630,000*l.*; having regard, however, to the opinions of the police on the subject of traffic, and also the expense, that scheme had been rejected. The scheme which they had adopted would cost 250,000*l.* for the lowering of the bridge and the gradients, and 100,000*l.* would be for compensation to owners of property. The cost would be paid by the Corporation out of its own money, and would not come on the rates.

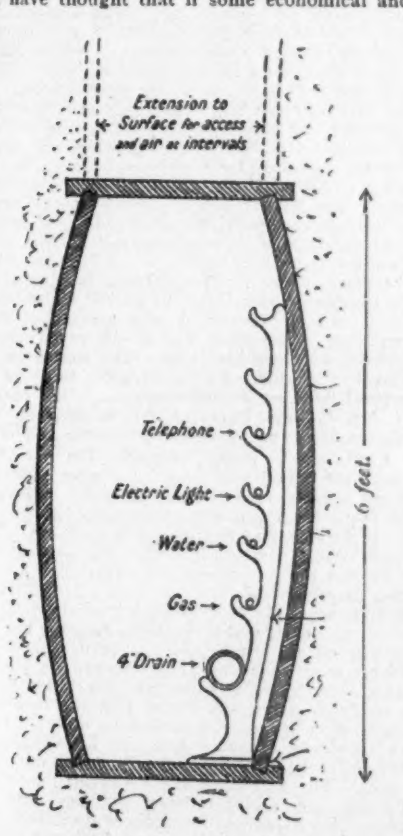
Mr. G. Edwards moved as an amendment:—"That the report be referred back to the Committee to submit an estimate for making the northern approach to the new bridge level, by constructing a viaduct over Upper Thames-street and raising the surface of Queen-street from Cannon-street, omitting the two proposed inclined planes in Upper Thames-street and constructing a new spur street from Upper Thames-street to the new approach." After some discussion the amendment was lost, and the report was then adopted.

Correspondence.

"INEFFICIENCY OF MODERN HOUSE DRAINAGE."

SIR,—In reference to Mr. W. R. Purchase's article on the inefficiency of house drainage, I should like to add my testimony to the great waste of time and money that eventually occurs by filling in the trenches and covering up out of sight and ready access of underground pipes of all kinds, as well as of drains. It has frequently occurred to me that a trench once opened should never be filled up to a greater extent than would allow of a tunnel for access being still left.

I have thought that if some economical and



effective method of forming such tunnels could be devised, perhaps by lining the excavation with slabs of vitrified stoneware, or artificial stone, or possibly cast-iron, somewhat in the form indicated in the annexed sketch, it would soon be very generally adopted. These tunnels might be too expensive to cause them to be adopted in the case of shallow drains just 2 ft. to 3 ft. below the surface in country places, but there is no doubt that they would pay for themselves over and over again in the case of deeply-laid drains in heavy clay soils, where drains are always being torn asunder by the movement of the clay, and are consequently frequently in need of being taken up for repairs. The tunnels should be at least 3 ft. by 2 ft., and perhaps they would be far more useful if 6 ft. by 2 ft. or 2 ft. 6 in.

I suggest slabs as being labour saving in fixing and more likely to be water tight against soil moisture, owing to fewness of joints, than laboriously constructed brick culverts. The latter, too, would need an excavation at least 12 in. wider than slabs would require. An extension upwards at the necessary points, with a cover on the top, would form the necessary manholes for access, which would not need to be so numerous as at present.

W. B. HOPKINS.

SIR,—I have read the article by Mr. R. Purchase in *The Builder* of 19th inst. on the subject of the inefficiency of modern house drainage, and I should like to say that I entirely disagree with his statement that "the stoneware pipe as a material for house drains has proved a failure."

In my opinion, the stoneware pipe drain, when properly constructed, is a great success. I fully admit that an improperly-laid stoneware pipe drain is a distinct failure.

My experience has shown me that there are very few people who know how to construct a stoneware pipe drain.

The slovenly specifications one sees are productive of much bad drainage.

If architects and others would write a full and detailed specification for the sanitary work, as they do for the other parts of their buildings, and would rigidly enforce such specification, we should hear less of leaky drains.

ROBERT WOOD, Mem.San.Inst.

SIZES OF GLAZED BRICKS.

SIR,—Among the many hints and suggestions which appear from time to time in your own and other journals devoted to the trade, I do not remember to have seen one to the effect, that glazed bricks, now so extensively used in London and the district, should be reduced from 2¾ in. thick to 2½ in. thick. All interested know the difficulty there is in "keeping down," so as to work with stocks. I suppose it is a question of machinery having to be altered, but this would soon recoup itself as far as the manufacturer is concerned, and the little "extra mortar" would be more than equalled by the time saved in laying. I have just taken four glazed bricks from stack; these measure dry 11¾ in.; four stocks taken from stack measure just 10¼ in. There is thus 1½ in. for four joints in the stocks, and ¾ in. in the glazed bricks. Add to this that even the glazed bricks are somewhat irregular, and it follows that to work "four courses to the foot" becomes difficult; in fact, frequently it is brick and brick, with mortar in the frog only.

SUGGESTION.

SWANSEA COMPETITION FOR HOUSING THE WORKING CLASSES.

SIR,—In June last designs for this competition were sent in. Have you or any of your readers heard anything of a result or decision? Is this "affair" to add another story to the mighty monument of bogus competitions?

AD. REM.

BOOKS RECEIVED.

ABYDOS. Part II. By W. M. Flinders Petrie. Twenty-fourth memoir of the Egypt Exploration Fund. (Kegan Paul, Trench, Trübner, and Co.)

NOTES ON STEEL-CONCRETE CONSTRUCTION. By Major J. Winn, R.E. (Chatham: W. and J. Mackay and Co.)

THE CANDIDATE'S GUIDE TO EXAMINATIONS AND APPOINTMENTS IN THE BUILDING TRADES. By George Ellis. (By the Author, at Ilford, Essex. 6d.)

GUIDE TO THE SEARCH DEPARTMENT OF THE PATENT OFFICE LIBRARY. Second Edition. (Patent Office. 6d.)

APPOINTMENT OF DIOCESAN SURVEYORS.—It is announced that at a meeting held last week of the archdeacons and rural deans of the diocese of Bath and Wells for the appointment of diocesan surveyors in pursuance of the terms of the Ecclesiastical Dilapidations Act of 1871, for the five years next ensuing, the following gentlemen were duly elected:—Mr. C. R. Wainwright, of Shepton Mallet; Mr. E. M. Hippisley, of Wells; and Mr. A. B. Cottam, of Bridgewater. Mr. Cottam succeeds Mr. Samson, who has resigned the office after a tenure extending over twenty years. Messrs. Hippisley and Wainwright have held the office during many years past.

The Student's Column.

CONCRETE-STEEL.—XIII.

SHEARING STRESSES IN BEAMS.

ALL the formulæ hitherto discussed are based on the assumption, that if sufficient steel be employed for resisting bending moments, shearing stresses may safely be left to the concrete. No doubt the concrete is perfectly capable of taking shearing stresses up to a certain limit, within which the safety of the beam may be fully assured, but greater strength is attainable by more complete conformity with theoretical requirements, and, generally, greater economy may be secured thereby.

Shearing force in a beam is developed by the downward action of the load, and the upward reaction of the supports. In the case of a beam with a uniformly distributed load, and supported at the ends, the maximum shearing force has the value. $-wL \div 2$ at the left hand end, decreasing uniformly to zero at the middle of the span, thence increasing uniformly to $wL \div 2$ at the right-hand end. If the load be concentrated at the centre of the beam, the shearing force will be constant throughout, and equal to $W \div 2$, but the force will be positive along one half of the beam, and negative along the other half.

It is known that when a test specimen is pulled asunder or crushed, failure is due wholly or in part to shearing action on surfaces inclined to the direction of the force exerted. Further, it is known that beams frequently fail in consequence of tensile stresses resulting from shear. These facts show that it is very necessary for the designer of concrete-steel beams to consider the nature and influence of shearing stresses, and to make due provision for them in all works to be executed.

A state of simple shearing stress, or, as it is alternatively called, a state of simple shear, occurs when two simple stresses of equal intensity act in opposition. Under such a condition there is no normal stress on a plane inclined at 45 deg. to the two directions, because the normal component of one force is equal and opposite to that of the other, and nothing remains but shearing, or tangential, stress.

Hence the state of simple shear is one in which there are two principal stresses only, giving rise to a stress that is wholly tangential on the two planes inclined at 45 deg. to the axes of principal stress, and that is equal in intensity to the intensity of either of the principal stresses.

The same conclusion may be reached by a different line of reasoning. Thus, if to a cube of unit dimensions, represented by the rectangle in Fig. 21, tangential stresses QQ, be applied to the pair of opposite faces A and B, and equal tangential stresses QQ, to the pair of opposite faces C and D, the effect will be to create a state of simple shear. There will then be only tangential stress on all planes parallel to A and B, and to C and D, the intensity of the stress on each system of planes being equal throughout to the intensity applied to the face of the cube.

In order to show the relation between these two modes of defining a state of simple shear, we will consider the equilibrium of two triangular prisms, Figs. 22 and 23, into which the cube is now assumed to be divided by diagonal planes of section. To balance the stresses QQ, Fig. 22, we must have normal tension P, on the diagonal plane. As the diagonal is at 45 deg. to the horizontal, its length compared with the length l, of any side of the cube is $l \sec. \theta$, or $l\sqrt{2}$, and the amount of the tension is $P = Q\sqrt{2}$. As the area acted over by P is $\sqrt{2}$ times the area over which Q acts, it follows that the intensity of P is equal to the intensity of Q.

Taking the opposite prism, Fig. 23, similar conditions prevail, but normal compression P, is here evidenced, the value of which is $P = Q\sqrt{2}$ and for the reason already given the intensity of P is equal to the intensity of Q. Therefore the state of simple shear admits of analysis into two equal and opposite principal stresses, one tensile and the other compressive, acting in directions at right angles to one another, and inclined at 45 deg. to the directions of the shearing stress.

It is important to remember that tangential stress cannot exist in one direction unless accompanied by an equal intensity of tangential stress in a direction at right angles to the first

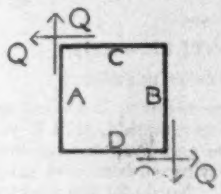


Fig. 21.

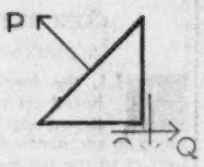


Fig. 22.

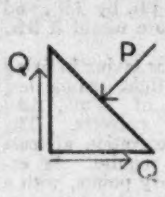


Fig. 23.

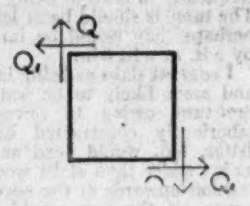


Fig. 24.

Fig. 25.

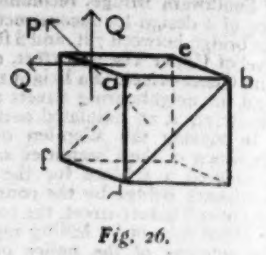


Fig. 26.

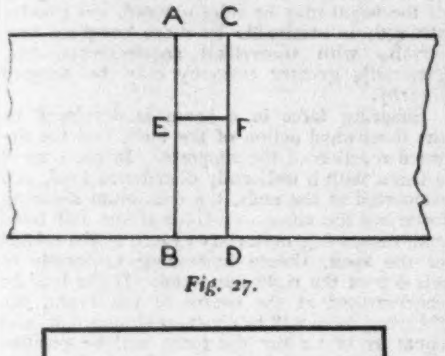


Fig. 27.

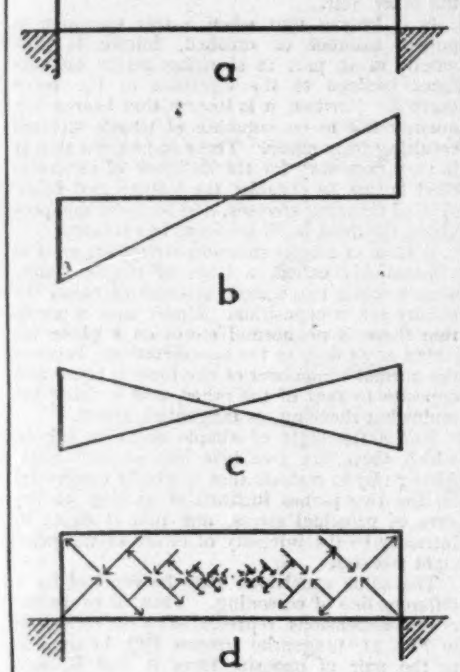


Fig. 28.

direction. The proof of this principle may be found by considering the equilibrium of a small cube of unit dimensions, represented by the rectangle in Fig. 24, and having one pair of sides parallel to the direction of the shearing stress Q. This stress, acting on opposite sides, produces a couple tending to rotate the cube. The couple cannot be balanced by any arrangement of normal stresses on any of the sides of the cube, and the only way in which the couple can be balanced is by an equal and opposite shearing stress Q_1, acting at right angles to the first direction, thus producing a couple that resists the tendency of the cube to rotate under the action of the first couple. In this case it will be seen that the cube is subjected to equal shearing stresses on two pairs of opposite faces, and the resultant stresses form a system of forces in equilibrium. The cube will be distorted into the form of an oblique prism, without perceptible change of volume. Hence, as in Fig. 25 it will assume a form such as Ab Dc. The material must be lengthened in the direction AC, and shortened in the direction DB, so that the diagonals become Ac and Db respectively, causing tension in one case and compression in the other. And it can be shown that the extension and compression along the diagonals of the face of a cube are each equal to half the sliding that takes place.

Let us next consider the diagonal plane, *b e f d*, Fig. 26, in a cube of any given dimensions, and forming part of a beam. Representing the area of one face of the cube by *a*, we have for the area of the diagonal plane $a\sqrt{2}$. As previously demonstrated, the forces QQ, to the left of this plane have a resultant $P = Q\sqrt{2}$, normal to *b e f d*. Hence, there is on the plane a tensile stress of intensity

$$P_t = (Q\sqrt{2}) + (a\sqrt{2}) = Q \div a.$$

If Q represents the whole shearing force, the intensity of shearing stress $q = Q \div a$.

Hence—$f_t = q = Q \div a$

Similarly, on a diagonal plane at right angles to *b e f d*, there is a compressive stress of intensity—

$$P_c = (Q\sqrt{2}) \div (a\sqrt{2}) = Q \div a.$$

Whence—$f_c = q = Q \div a$

It is now clear that tensile stress f_t, of intensity equal to the intensity of vertical or horizontal shearing stress *q*, acts over the whole of the diagonal plane *b e f d*, and that compressive stress f_c, of intensity equal to the intensity of vertical or horizontal shearing stress *q*, acts over the whole of a diagonal plane at right angles to the plane *b e f d*.

There are other aspects of shearing stress that deserve attention. We have shown that the shearing stress at any point in the vertical cross-section of a beam is accompanied by a shearing stress of equal intensity in a horizontal plane through the same point. Therefore, if AB and CD, Fig. 27, represent two vertical sections separated by the distance δx, the intensity of shearing stress in the plane of EF is equal to the intensity of the shearing stress at the point E in the section AB.

If *q* equals the intensity of vertical shearing stress at E, or at any other point in AB, and *b* the width of the beam at the same point, the intensity of horizontal shearing stress equals *q*, and the total horizontal shearing stress Q, in the plane EF, or in any plane corresponding to the point selected in the section AB, is $Q = q\, b\, \delta x$.

Again, considering an infinitesimal area in the section AB at the distance *y*, from the neutral axis, the intensity of shearing stress *q*, on the area may be expressed—

$$q = \frac{Q}{2I}\ (h^2 - y^2)$$

where Q equals the total shear on the section; I equals the moment of inertia of the section about the neutral axis; and *h* equals the distance of the extreme fibre from the neutral axis. Hence, it is seen that for any vertical section *q* is at a maximum when *y* equals 0, or, in other words, that for any given vertical cross-section the intensity of the shearing stress is greatest for points on the neutral axis, diminishing to zero at the top and bottom of the section. The further inference is to be drawn, that for any point at a given distance *y* from the neutral axis, *q* is greatest where Q is greatest.

From the foregoing consideration it is evident that the intensity of the tensile and compressive stress on planes inclined at 45 deg. to the horizontal, is greatest for points on the neutral axis in the plane of maximum shear, and that at any such point it is equal to the vertical or the horizontal shear at the same point.

In Fig. 28 let (*a*) represent a uniformly loaded beam supported at each end, and (*b*) the diagram of shearing force. Then the diagonal stresses of tension and compression will vary in intensity from point to point along the length of the beam as suggested in (*c*), which represents the diagram of shearing force in an altered form.

The final result is indicated in (*d*), where the uniformly varying intensity of tensile and compressive stress is represented on the vertical longitudinal section of the beam, it being understood, of course, that the greatest intensity in every plane occurs at the neutral axis.

In the case of a steel beam of I-section with wide flanges and a thin web, the intensity of shearing stress is nearly uniform over the whole of the web, although varying from point to point along the length with a uniform load, and it is much greater in the web than in the flanges, owing to the comparative thinness of the web. Again, for rectangular beams of steel, wrought iron, and wood, it is the fact that safety against shear will be assured if the design be such as to afford safety against the results of bending moment.

When beams of concrete steel are in question, however, the conditions are by no means similar. In the first place, we have two different materials which must adhere so firmly together as to behave similarly to one homogeneous material, and unless this condition be secured, the object of the designer will be frustrated. In the second place, the concrete in the tension area is not capable of resisting the tensile stress caused within the area in question, and as a general rule is not relied upon for the resistance of any part of the tension. Consequently, it is desirable to ascertain whether or not the shear in the horizontal plane of junction between the concrete and the steel reinforcement is sufficient to overcome the adhesion between the concrete and the steel; and whether the intensity of the tensile and compressive stress on planes inclined at 45 deg. to the horizontal is within the safe, or permissible, limits of tensile stress for the concrete employed.

GENERAL BUILDING NEWS.

PARISH HALL, TYNEMOUTH.—A new parish hall which has been erected at Tynemouth was recently opened. The building is of red brick, with stone dressings, the doors and windows on the principal front having moulded architraves, pediments, etc. The accommodation consists of a parish-room, a gymnasium, with lavatory, a reading-room, in which provision is made for a billiard table, with caretaker's apartments at back, all on the ground floor. On the first floor is a large hall, with seating accommodation for about 500, including the gallery. There are also ladies' and gentlemen's cloak-rooms, separated by a sliding partition, so that when required the rooms can be thrown into one. Tea boilers and a sink for use at entertainments are provided here. Two staircases lead from the main entrance and a relief staircase from the platform end, leading down into the reading-room. The platform is constructed on trestles, so that it can be moved and sections of it readily converted into tea tables when required. The main hall has a coved plaster ceiling, with moulded ribs. The rooms on the first floor are lighted by electricity; those on the ground floor by incandescent gas. The builder is Mr. Gilbert Park, of North Shields, and Messrs. Hicks and Charlewood are the architects.

CHILDREN'S HOME, FILEY.—On the 14th inst., the foundation-stone of a new children's home to be erected at Filey was laid. The new building is to provide accommodation for the invalid children of the poor of Rotherham. The main rooms face south. The ground floor will comprise the following:—A large dining-room and playroom (36 ft. by 20 ft. 6 in.), heated by two open fire places, and having windows facing south and east, and a verandah running the full length on the south side, a pantry next the dining-room with sink and cupboards, a kitchen with communication direct into the dining-room, a scullery, stores and larder, hall and staircase, separate entrances and lavatories, etc., for boys and girls, a separate entrance for visitors, a matron's sitting-room, matron's stores, and sick-room. The first floor will be divided into two halves, one side for boys and one side for girls. Each half will contain a dormitory (for 12 beds), a matron's bedroom, bathroom, linen stores and lavatories. The second floor will contains two large bedrooms, a boxroom, and a lumber-room. The building will be of pressed bricks, with brick sills, and the upper half of the external walls on the principal elevations will be finished with cement stucco tinted cream white. The roof will be of red tiles. The ventilation will be principally by "ventilating sashes," having broad bottom rails, admitting air half way up the window. The building will be plain inside and out, no unnecessary ornament or mouldings to create expense or to collect dust will be found. Accommodation will be provided for 24 children. Water is already

laid on in the roadway. A fire hydrant will be provided on the site. The drainage will empty in a septic tank, and it is proposed to pass the effluent over a filter bed before discharging into the dyke. The contractors are Messrs. John Jaram and Sons, of Scarborough, the architect being Mr. J. E. Knight, of Rotherham. The cost of the buildings (exclusive of stoves, lavatories, fittings, and laying out of grounds) will be about 1,650*l.*

NEW BAPTIST CHURCH, BRIGHTON.—The foundation-stones of a Baptist Church, to be erected in Gloucester-place, Brighton, were recently laid. The building will be Gothic in style, with white flint walls, and terra-cotta dressings and tracery. A broad gable in the centre, having a prominent portico leading to the church, and above this a traceried window; flanked on the one side by a staircase wing and turret, and on the other by a tower, rising to a height of 58 ft. above the pavement, terminated by a spire 98 ft. to the top from the road. The accommodation will be for 450 adults on the ground floor and 300 in the galleries, allowing for a congregation of 750 persons. The gallery is, however, for the present to be omitted from the scheme. The seating on the ground floor is arranged on a semi-circular plan, so that each hearer will be able directly to face the preacher. The ceiling is domed. The church will be lighted by traceried windows, the interior being heated by hot-water pipes and radiators. The electric light fittings are to be in wrought iron and copper. The baptistry will be lined with white marble, candidates passing direct under the pulpit into the vestries, of which there are three. The basement will comprise a large hall and three classrooms for the Sunday school, a church parlour, and kitchen. The architects are Messrs. George Baines and R. Palmer Baines, of St. Clement's Inn, the builders are Messrs Battley, Sons, and Holness, Old Kent-road.

COTTAGE HOMES, PONTELAND, NEWCASTLE.—The cottage homes which are being erected at Ponteland, Newcastle, for the Newcastle Board of Guardians, are now nearing completion. The estate on which the homes are situated covers seventy acres. The buildings are erected in blocks of a semi-detached villa character. There are six designed for the residences of the children, five of which are now completed, whilst the sixth is in course of erection. At the entrance to the grounds is a porter's lodge, which will be the residence of the gardener. In close proximity there is a recreation hall, which will also serve as a schoolroom for the infant children. The recreation hall buildings have a 74 ft. frontage with a depth of 56 ft. The hall itself is 50 ft. long by 30 ft. broad, and has a large stage at one end. On each side are large classrooms 20 ft. by 16 ft. The building will be heated with hot water on the low pressure system. The residential blocks are erected in crescent shape with flower gardens in front and yards and large kitchen gardens behind. The first will be the administrative block, and is the residence of the superintendent. The committee having charge of the homes will hold their meetings in a room in this building, which contains also the superintendent's office and the necessary store accommodation. The administrative block is next to the children's residences, in the first of which there will be accommodation for forty, in addition to their attendants. The remaining blocks are each arranged to hold thirty children. They are subdivided, and in each half there are a kitchen, dayroom, scullery, lavatory, bathroom, and three larders on the ground floor; whilst on the first floor there are two large dormitories, foster-parents' room, and small bedroom. The kitchen in the first block is 22 ft. 6 in. by 16 ft., and the dayroom is 16 ft. by 20 ft. The larger dormitory is 22 ft. by 15 ft. 6 in., and the smaller one 20 ft. by 16 ft. The size of the rooms in the other blocks is somewhat smaller, the kitchens being 18 ft. by 16 ft., the dayrooms 18 ft. by 15 ft., the dormitories being 18 ft. by 15 ft. and 15 ft. by 14 ft. respectively. Concrete flats run the length of each building to minimise the danger to human life in case of fire. The drainage is on the septic principle. The blocks are made of brick and rough cast or stucco. They are connected with each other by neat trellis work; and, altogether, they have a charming appearance. In addition to the residential portion, there is a water tower 50 ft. high, containing a tank capable of holding 12,000 gallons of water, which is pumped up by a mill from a boring. There is a stable behind the tower, in which there are three stalls and loose box; a coach-house, and out-offices. In the grounds a workshop has been erected. The work has been carried out by Messrs. Edward Henderson and Son, contractors, of Ponteland, from the plans of Messrs. Oliver Leeson and Wood, architects, of Newcastle.

THE CITY TEMPLE, HOLBORN VIADUCT.—After having been closed during two months, the City Temple was re-opened last week. During that interval the interior and the lecture-hall and assembly rooms have been extensively decorated and improved, at a cost of nearly 7,000*l.*, by Messrs. Campbell, Smith, and Co. The improvements comprise new lighting (by electricity), heating, and ventilation, the strengthening with iron girders of the stone staircases in the vestibules leading up to the galleries, and the removal of the platform away from the pulpit, which was a gift made by the Corporation of the City. A stained glass window has been set up to commemorate the thirty-three years' ministry of the late Dr. Joseph Parker. One unusual feature calls for a passing notice, as it might with advantage be repeated in respect of similar public or quasi-public buildings. Upon a board outside the fabric is painted an inscription which embodies a useful, albeit brief, statement of the history of the City Temple, of its predecessors, and of the earlier congregations, represented by those who now attend the services. The memorial window depicts St. Paul's farewell to the brethren at Ephesus, and in the base is a medallion portrait of Dr. Parker, with two angels as supporters, designed and executed in white marble with a background of polished red granite by Mr. E. J. Physick.

INDIA OFFICE.—The present putty glazing has been removed from the large iron roof over the inner courtyard of the India Office, and the roof is being re-glazed with Helliwell's system of glazing without putty.

NEW VOLUNTEER HEADQUARTERS, LANCASTER.—New headquarters for the 5th Royal Garrison Artillery Volunteers, Lancaster, are about to be erected. The site comprises 1¼ acres, and is situated in Dallas-road and Carr House-lane. The plans provide on the ground floor on the left of the site a gun and drill shed, 150 ft. by 75 ft. The roof will be of single span, and there will be no pillars. The floor will be of rolled Carnford gravel. The building will be lighted by four windows on each side. To the north of the drill shed on the ground floor will be the orderly room, to which there will be access direct from the drillshed The "O.C.'s" room adjoins, and on the same level are men's clubroom, reading-room, and canteen. The men's clubroom, it is stated, will be nearly as large as the Council Chamber in the Town Hall. The main entrance is from Dallas-road. There will be an entrance hall 24 ft. by 26 ft., on the right of which are officers' room, sergeants' room, and corporals and bombardiers' room. From the entrance hall a staircase leads to the instructor's quarters, the other arrangements on this floor comprising an ambulance and lecture-hall, 40 ft. by 24 ft., signallers' room, two storerooms, armoury, a kitchen and serving-room, which will be of advantage when festivities are taking place. The entrance to the yard will be through large gates at the Carr House-lane corner. The work will be proceeded with immediately the plans have been sanctioned. The building will cost 6,000*l.*, and is being erected from the plans of Messrs. Harrison, Hall, and Moore, architects.

CONGREGATIONAL CHURCH, LITTLE ILFORD.—The church and schools occupy a prominent corner site. They are designed in a late period of Gothic freely treated, and are faced externally with red brick, the dressings and tracery, etc., being of white Costessey work. There is a tower and spirelet at the angle. A fireproof staircase runs up inside the tower, leading to the gallery. Ministers' and deacons' vestry are provided in connection with church, with other conveniences. The seating is circular on plan, radiating from the pulpit as a centre. The total accommodation of the church is for 724 persons. The school has a main hall on the first floor, with retiring-rooms, kitchen, cloakroom, etc. On the ground floor is the minor hall, together with three classrooms, and a portion of the minor hall is arranged so as to be divided off into classrooms by means of swivel partitions. The whole of the buildings are heated by hot-water pipes and radiators on the low pressure system. Electric light is to be adopted throughout. The contract for the two buildings complete is 4,435*l.* Messrs. George Baines and R. Palmer Baines, of London, are the architects, and Messrs. F. Gough and Co., of Hendon, the builders.

NEW WESLEYAN CHURCH, POLPERRO.—Memorial stones of a new Wesleyan church, Polperro, were laid recently. The new building will be in the Late Gothic style, and built of stone. The front will have a four-light traceried window of terra-cotta, flanked with buttresses, and two single-light windows and corner buttresses. The other windows throughout will have segment heads, except one in the rear gable, which will be circular, with Late Gothic tracery. The interior roof is to be partially open and ceiled with pitchpine, the timbers having arched work underneath. A light gallery will be placed at one end and two sides, with a raised choir and organ chamber behind the rostrum, which, like the pews and gallery front and other internal joinery, will be of pitch-pine. The cost of the work, including a vestry and necessary fencing, will be 1,700*l.*, in addition to which the cost of land and transfer, the architect's fees, etc., will amount to 300*l.* Towards this total of 2,000*l.*, only 300*l.* is in hand, but the subscriptions yesterday would, it was anticipated, bring the amount up to 600*l.* When 1,300*l.* has been raised, 200*l.* has been promised from the Twentieth Century Fund. The new church is to be completed by August 15, 1904. Mr. J. Wills is the architect.

COUNTY ASYLUM, BROMSGROVE, WORCESTERSHIRE.—The foundation-stone of a new County Asylum, to be erected at Bromsgrove, Worcestershire, was recently laid. The new building will consist of a main asylum capable of accommodating 570 patients (254 males and 316 females), with administrative offices sufficient for an extended asylum for 1,000 to 1,200 patients. In addition to the patients' wards, the institution will contain a large recreation hall, kitchens, and offices, quarters for nurses and attendants, workshops, laundry buildings, and also offices for the Visiting Committee and staff, together with accommodation for assistant medical officers. The detached buildings comprise a chapel, with sitting accommodation for 420 persons, a residence for the medical superintendent, an isolation hospital for the treatment of infectious disease, eight cottages for married attendants, and an entrance lodge. Attention has been given to the question of the provision of fire appliances, and to the means of escape from the building in case of fire. The asylum will be two stories high, and fire hydrants will be installed. The windows are of special design to allow of easy exit, and, in addition, there are stone fire-proof escape staircases, and sliding iron doors for the purpose of preventing the spread of any outbreak. The buildings will be lighted by electricity, generated in the engine-house. Water is procured on the estate from two bore holes already sunk to a depth of 350 feet and 341 feet respectively. The water, which is reputed to be of excellent quality, has risen to within 26 ft. below the ground surface, and it will be pumped into large tanks in a tower and conveyed by gravitation in pipes to the various buildings. The available supply from each bore hole is 7,000 gallons per hour. Rain water for use in the laundry and boiler-house will be collected in a large underground tank capable of holding 150,000 gallons. The estimated total cost of the erection, furnishing, and equipment of the buildings, irrespective of the site, is 215,887*l.* The contract for the buildings (Messrs. B. Whitehouse and Son) amounts to 151,475*l.*; the cost of the boilers and heating is 10,412*l.*; 950*l.* to be paid for work at the wells; the electric light installation will cost 8,000*l.*, while 2,500*l.* is involved in the construction of roads. The cost of furnishing and equipment of the asylum, with 570 beds at an estimated outlay of 25*l.* each, is 14,250*l.*, and 3,000*l.* is to be expended in the laying-out of the grounds, gardens, airing courts, etc., and planting. The amount of the estimates for building works (185,637*l.*) shows an average cost of 325*l.* per bed for 570 beds. Mr. G. T. Hine, of Westminster, is the architect.

SANITARY AND ENGINEERING NEWS.

SEWAGE WORKS, GLASGOW.—The annual inspection of the Western District Sewage Works, Glasgow, by the members of the Glasgow Corporation, took place on the 15th inst. The drainage scheme for the city embraces three sections, each distinct from the others and with separate works for the disposal of the sewage. The first of these, authorised in 1891, and doubled in extent in 1901, comprises about 11 square miles, one-half being within the city and the remainder in the landward district of the county of Lanark. The works for the treatment and disposal of the sewage of this area are situated at Dalmarnock, and the drainage is collected and conveyed there by a main sewer constructed at the cost of the Caledonian Railway Company. The second section was authorised in 1896, and includes the municipal area on the north side of the river not provided for in 1891, the burghs of Partick and Clydebank, and intervening parts of the counties of Renfrew and Dumbarton, the whole extent being 14 square miles. The works for the disposal of the sewage derived from this area are situated on the river bank at Dalmuir, about seven miles below Glasgow. The third section, authorised in 1898, comprises the whole of the municipal area on the south bank of the river, the burghs of Rutherglen, Pollokshaws, Kinning Park, and Govan, as well as various residential and rural districts in the counties of Lanark and Renfrew. The extent of this section is 14 square miles, and it may be enlarged by the inclusion of the burghs of Paisley and Renfrew. The works for the disposal of the sewage of this area will be situated on the river bank at Braeshead, about one mile eastward from Renfrew. The principal

features of the western scheme are the construction of an outfall sewer to convey the drainage of the higher levels of Glasgow and Partick to the works at Dalmuir; the construction of an intercepting sewer to collect the drainage of the lower levels of the city; the construction of an intercepting sewer to collect the drainage of the lower levels of the burgh of Partick; and a third intercepting sewer to convey to the Dalmuir Works the drainage of the burgh of Clydebank. The levels of the Partick and Clydebank intercepting sewers are sufficiently depressed to admit the drainage of the Upper district of Renfrewshire, situated to the west of Glasgow and Partick and to the east of Clydebank, and negotiations are in progress for adjusting the terms for the inclusion, in accordance with the provisions of the Sewage Acts, of that territory, within the main drainage scheme. The Glasgow and Partick intercepting sewers will be pumped into the outfall sewer at Partick Bridge, the lift being 37 ft. The pumping engines, three in number, are of the triple-expansion inverted marine type, with plunger pumps, each capable of raising 11,250 gallons per minute, or 16 million gallons per day. Steam is supplied to these engines by four boilers, working at a pressure of 160 lbs. per square inch The Clydebank intercepting sewer will be pumped at Dalmuir, the lift being 21 ft. The smaller engines at Dalmuir will be of the centrifugal type, and power for the sewage treatment plant will be transmitted by electricity. Rather more than one-half of the total sewage of the western scheme will be carried without pumping to the Dalmuir Works, where the whole contents of the outfall sewer will be delivered into the precipitation tanks above tidal level. The purified effluent from the tanks will pass by gravitation over a discharge weir into the river, and the sludge will be pumped into specially-constructed barges and conveyed to sea. After careful deliberation and much patient investigation, it was resolved to adopt at Dalmuir the same method of sewage treatment as that which has for the last seven years been in successful use at Dalmarnock, with this exception, that the sludge presses, which by the compulsion of the situation of Dalmarnock Works, have been employed there, are to be dispensed with, and the liquid sludge carried out to sea. The precipitation tanks at Dalmuir, which are to be worked on the system of under-surface continuous flow, are more favourably situated than those at Dalmarnock, each being about 750 ft. in length, thus allowing opportunity for more complete precipitation than is afforded in the shorter tanks at the Dalmarnock Works, and effecting a saving in the reduced proportion of chemical agents required for the process. The work that has been completed up to the present time represents a large proportion of the whole undertaking. The western outfall sewer is constructed; the Partick and Clydebank intercepting sewers are virtually finished; the Glasgow intercepting sewer is being vigorously advanced; the Partick pumping station is nearing completion; the precipitation tanks, dock, wharf, and outfall works at Dalmuir are constructed; and the sludge tanks, pump-house, machinery, and other works are in active progress, and sufficiently advanced to warrant the hope that the greater part of the sewage derived from the western area will be undergoing purification during the course of next year.—*Glasgow Herald*.

FOREIGN.

FRANCE.—M. Jean Boucher, the eminent sculptor, has been created Chevalier of the Legion of Honour, on the occasion of the inauguration of the monument to Renan erected at Trégnier, and designed by him.——M. Albert Besnard has been commissioned to paint the ceiling of the new Salle of the Théâtre Français, in place of the temporary decoration by M. Jambon.——The French Government has offered to the King of Italy a gold medal in commemoration of his visit to Paris. It is modelled by M. Chaplain, and has on the obverse the profile heads of the King and Queen, and on the reverse an inscription surrounded by a garland.——M. Roty has executed a medallion portrait of Coquart, which is to be placed in the Ecole des Beaux-Arts, in the entrance, facing the monument to Ingres.——The Department of Public Instruction has been authorised to accept the gift to the State, by M. Osiris, of the château and estate of Malmaison, once the home of Napoléon.——A monument to Colonel Gillon, who fell in the Madagascar campaign, was inaugurated, on Sunday last, in the principal street of Chaville. The sculptor is M. Boverie, and the architect M. Sandier, the Director at Sévres, who has had the pedestal executed in polychromatic stoneware.——A new Hôtel de Ville has been inaugurated at St. Emilion (Gironde).——It is stated that the Municipality of Arles intend to demolish the ancient ramparts of the town, including the "Porte de la Cavalerie" and two towers dating from the sixteenth century.——The Municipality of Valenciennes intend to construct a new museum on a site once occupied by part of the ancient fortifications of the town.——The death is announced, at the age of 74, of M. Jules Pellechet, member of the Société Centrale des Architectes, and Chevalier of the Legion of Honour.——The death is also announced, at Nice, of a young architect of great promise, M. Marcel Moisand, a former pupil of M. Moyeux, and who obtained, in 1901, the Chaudesaignes prize. He was only 29 years of age.

NEW THEATRE, SYDNEY.—Her Majesty's Theatre, Sydney, which was burnt down in March, 1902, has been rebuilt on a new and improved plan. In the new building there are only two tiers. The total seating capacity of the theatre is 2,000. There are 236 seats in the dress circle, 670 in the stalls, and 1,000 in the amphitheatre, which will, however, hold more when crowded, thus making the capacity as stated. The abolition of the second tier has lowered the level of the theatre considerably. The dress circle is reached by a grand staircase, opening into a promenade 50 ft. long, leading at either end to richly-furnished foyers, with cloakrooms adjoining. From the foyers, swing doors give admission to the dress circle. This arrangement excludes all noise. The upholstering of the circle is in sapphire velvet and plush, with paler tinted carpets, while in the stalls it is royal blue. There are two boxes on either side. The general colour tone of the theatre is cream and gold. A new entrance has been provided in Market-street. The Hon. William Pitt, of Victoria, is the architect.

UNITED STATES.—The Boston Museum of Fine Arts has erected on the site of its new building on the Fens an experimental structure consisting mainly of a large movable skylight, some 50 ft. above the ground, which is to be used for determining the best position, and the best lighting, for the skylight of the future picture-gallery. This proceeding is very similar to that carried out some years ago by the German Government, which, before constructing the new Parliament House in Berlin, had a full-size model made, in wood and plaster, of the assembly hall of the Parliament, as shown in the architect's designs, in order to study its acoustic qualities before carrying it into execution.——There are indications in certain parts of the United States that wages in the trades concerned in building have reached their highest point, and that the tendency is now downward.

MISCELLANEOUS.

PROFESSIONAL AND BUSINESS ANNOUNCEMENT.—The firms of Messrs. J. and H. Gwynne, Ltd., and Messrs. Gwynne and Co., both makers of centrifugal pumping machinery, have been amalgamated, and will now work under one management under the style of "Gwynnes, Ltd."

SCHOOL OF ART WOOD-CARVING.—The School of Art Wood-carving, South Kensington, which now occupies rooms on the top floor of the new building of the Royal School of Art Needlework in Exhibition-road, has been re-opened after the usual summer vacation, and we are requested to state that some of the free studentships maintained by means of funds granted to the school by the Technical Education Board of the London County Council are vacant. The day classes of the school are held from 10 to 1 and 2 to 5 on five days of the week, and from 10 to 1 on Saturdays. The evening class meets on three evenings a week and on Saturday afternoons. Forms of application for the free studentships and any further particulars relating to the school may be obtained from the manager.

DIARRHŒA AND POLLUTED WATER.—At a recent meeting of the Chelmsford Rural District Council Dr. J. C. Thresh, the County Medical Officer of Health, presented a report on an extensive outbreak of diarrhœa which had recently prevailed in the Borough of Chelmsford and a portion of the rural district. The epidemic commenced suddenly on July 25 and terminated as suddenly about August 25. The epidemic was limited in the rural district to a village deriving water from the Chelmsford mains, while in the borough it was limited to that portion deriving water from the same mains. One part of the borough supplied with water from a different source did not suffer from any excessive prevalence of diarrhœal disease, nor was there any excessive prevalence in any of the suburbs of Chelmsford deriving water from other than the implicated source. An inspection of the waterworks showed that water was pumped from a deep well into a large uncovered tank which permitted of road washings and garden soil being carried into it during heavy rains, and Dr. Thresh attributes the outbreak to the washing of such filth into the tank on July 23, when over two inches of rain fell in the 24 hours. An examination of the tank showed a deposit on the bottom consisting of soil, worms, etc. The water came early under suspicion, but analyses of samples taken from the various sources gave no indication of pollution. Water taken from the mains, however, showed undoubted signs of serious bacterial pollution. The water committee on August 23 had the implicated reservoir cut off and the epidemic at once ceased.—*Lancet*.

SOCIETY OF ARTS.—The Council of the Society of Arts holds a sum of 400*l*., the balance of the subscriptions to the Owen Jones Memorial Fund, presented to them by the Memorial Committee, on condition of their spending the interest thereof in prizes to "students of the Schools of Art who, in annual competition, produce the best designs for household furniture, carpets, wall-papers, and hangings, damasks, chintzes, etc., regulated by the principles laid down by Owen Jones." The prizes will be awarded on the results of the annual competition of the Board of Education, South Kensington. Competing designs must be marked "In competition for the Owen Jones prizes." No candidate who has gained one of the above prizes can again take part in the competition. The next award will be made in 1904, when six prizes are offered for competition, each prize to consist of a bound copy of Owen Jones's "Principles of Design," and the Society's bronze medal.

GROOVED WALL-PAPERS.—The Grooved Wall-paper Co., which has purchased the sole rights of the patent for grooving wall-papers, sends us specimens of wall-papers prepared with a fine machine-made groove near the edge of each piece, which forms the permanent butt-joint of the piece when hung, the edge trimming being easily detached along this groove after the piece is pasted on, thus saving time and ensuring an accurate joining up of the pattern.

IMPROVEMENTS AT WINDSOR CASTLE.—Under the superintendence of Mr. A. Y. Nutt, surveyor of the works at the Castle, some extensive improvements are being made of the drainage arrangements and of the approaches by road from the town, and a reparation is to be undertaken of some of the external stone-work of St. George's Chapel. At the same time, their proper names are being cut in bold letters above the various entrances into the palace; that which has been commonly known as the Equerries' entrance, in the yard facing the Round Tower, is now named after King Charles, whilst that by the State apartments is named after King John's Tower. King John's Tower, which gives access to the State apartments, stands in the Upper Ward, of which the east and south sides were built in 1356-73 for Edward III. by William of Wykeham. King John proceeded from the Castle to affix his seal to the Magna Charta at Runnymede.

THE IMPERIAL INSTITUTE.—The annual Report of the Imperial Institute, just issued by the Board of Trade, states that Professor Wyndham Dunstan, who has hitherto been Director of the Scientific and Technical Department, is nominated Director of the Imperial Institute, with general charge of the various branches there. For the future the Commercial Intelligence Branch of the Board of Trade will absorb the Commercial Intelligence Office, which hitherto has been maintained at South Kensington and in the City for the collection and supply of intelligence upon matters of commerce, tariff, and statistics, and the scope and usefulness of the work of that department will be extended by its migration from Parliament-street to new quarters within the limits of the City and in a situation easily accessible to business men.

PORTLAND CEMENT AND SAWDUST.—Excellent tiles can, according to Messrs. Seger and Cramer, be made with a mixture of Portland cement and sawdust. Nails can be driven through these tiles without causing the tiles to crack. In a recent issue of the *Thonindustrie Zeitung* the following proportions are mentioned as suitable for the manufacture of the tiles:—Damp sawdust 100 parts by weight, Portland cement 240 parts, water 48 parts. The sifted sawdust is well moistened and allowed to stand for twenty-four hours before being employed for mixing with the proportions of cement and water mentioned. The sawdust is used in a damp condition to prevent it from absorbing from the mixture the water required for the proper setting of the cement; and during the process of drying, after moulding, the tiles are repeatedly sprinkled with water with the same object in view. Previous attempts to make durable tiles with a mixture of sawdust and cement are said to have failed owing to the absorbent action of the sawdust.

OPPORTUNITY FOR BRICKMAKERS.—According to the *South African Export Gazette*, there is a great want of bricks for building operations in Maritzberg, though it is stated that there is abundance of good brick clay in the neighbourhood. This, says the *Export Gazette*, can only be attributed to one of two causes: "either local firms are unable or unwilling to increase their plants to cope with the demand, or they are

indifferent to the additional business which would follow by taking this judicious step, and are content with the trade they are doing. This being so, there is a splendid opening for Englishmen of enterprise with capital to go out to Natal, or to other parts of South Africa, and establish brick and tileworks on as large a scale as possible. There is scarcely a town in all South Africa where it would not pay, even if the situation were chosen haphazard, and it is a little surprising that brickmaking engineers in England, who are naturally interested in supplying the machinery, do not take steps to give prominence to the demand which exists, and thereby encourage expert brickmakers to emigrate."

THE "OTIS" ELEVATOR.—In consequence of a recent Report of the Committee on Science and the Arts of the Franklin Institute, an award of the John Scott medal and premium has been made to the Otis Elevator Company (U.S.A.). The lift examined was one of a type designed for private residences, and the following are the main features of the apparatus:—The lift hatchway is provided with a door on each floor, and the car also has a door. On each floor there is a push button on the landing, and in the car a row of buttons is provided, one for each floor, and a stop or safety button. Unless every door is shut and locked the car cannot be started, and unless the car is opposite to one of the landing doors, none of the doors can be opened. A single push on one of the car buttons brings the car opposite to the corresponding floor, where it is automatically stopped, and the lock on the landing door is similarly released. In opening the car door the controlling circuit is automatically cut off, and the elevator cannot be started by pressure upon the buttons at any other floor. If a passenger should then enter the car, he can close the landing door, but is unable to move the car until the inner door has been closed. During the trip none of the buttons on any of the floors have the least influence upon the motion of the lift. In case the inner door should be opened with the car in motion, the lift would instantly stop, and could not be started again until the door had again been closed. Many variations in the method of working are provided for by the makers, but in every case there appears to be ample security so far as this feature can be ensured by mechanical means.

SICILIAN ASPHALT.—It appears from the official statistics that in the year 1902, 5,262 tons of rock asphalt, valued at *1l.* per ton, were shipped from Syracuse to London, and 5,486 tons from Mazzarelli to London.

PORTLAND CEMENT IN GERMANY.—According to Mr. Consul-General Schwabach, the condition of the German Portland cement industry has for years been most unsatisfactory, owing to the prevailing disproportion between supply and demand. The inland consumption is estimated at 14,500,000 casks per annum, whereas the works can produce close on 29,000,000 casks. This enormous disproportion is due to the numerous extensions and new works erected in 1895 and the following years, partly on account of the activity in the building trade, but chiefly in the expectation that the Great Midland Canal would be built. Repeated attempts to form a German cement syndicate, and to regulate the prices and the production, have proved unsuccessful. The numerous local organisations compete severely against one another. Under these circumstances, very few other than the old-established works, whose brands are well known, are remunerative. The South African war, and the influence it exercised on the Transvaal gold-mining industry has also severely affected the trade, as very large consignments of cement were formerly sent to that country. German cement is practically excluded from the principal European markets by reason of prohibitive duties, and, while it is exempt from duty in Germany, the import duties, including clearing expenses, per 10 tons amount to *8l.* 10s. in Russia, *5l.* 5s. in Austro-Hungary, *6l.* 10s. in Roumania, *5l.* in Italy, *3l.* in Switzerland and Sweden, and *1l.* 5s. in Norway. Thus only the transatlantic markets are available for the exportation of German cement. In 1902 Germany imported 51,947 tons and exported 641,520 tons. In the first six months of 1903 the imports were 25,950 tons, and the exports 374,381 tons.

TIMBER TRADE IN FINLAND.—Reporting on the commerce, etc., of the Grand Duchy of Finland for the year 1902, Mr. C. J. Cooke, British Consul at Helsingfors, observes that the timber trade was good, thanks to the measures taken both in Sweden and in Finland. The general result was favourable, though no great rise in prices actually took place, nor did the termination of hostilities in South Africa have so great an effect as was expected. During the South African war timber prices were very low and the market much depressed, but since peace has been established prices have gone up, and it is to be hoped that they may remain steady, as almost every one of the saw-mill proprietors have agreed to reduce their production, which means a decrease of about 200,000 standards. Even if this figure be exaggerated, it is certain that a considerable decrease has in fact taken place, which has tended to keep prices up. The great export of round timber, which for many years has taken place from Finnish forests to Sweden, is certainly, from a national point of view, a disadvantage. Ever since the year 1897 a great number of logs, of large dimensions, have been exported from Northern Finland to Sweden and there sawn into deals, and consequently the price for such timber has gone up considerably and labourers' wages have been improved; but still it is considered a loss to Finland in more ways than one that the timber should be exported in a raw state instead of being sawn up before exportation. The timber market is at present in a firm but somewhat uncertain position, as the British buyers have not yet decided to pay the price demanded by the exporters. Their reserved bearing has also influenced the French and other Continental markets, except the German, which has bought up large amounts of timber of late. The Utra Wood Company have sold their sawmills and extensive forests in the north of Finland to Messrs. Gutzeit and Co., of Kotka. The export of this firm has amounted to about 14,000 standards a year, and promises to far exceed that amount in the future. At a meeting of Finnish saw-mill owners in 1902 the president gave accounts for 95 saw-mills, and said that the production for 1902 amounted to about 337,972 standards, against 328,066 standards in 1901. The sawn goods remaining, deducting those sold, at the close of navigation in 1902, were 103,159 standards, against 139,422 standards in 1901. The total shipment was, therefore, in 1902, 373,181 standards, as against 318,193 standards in 1901. During the winter the number of logs sawn was 8,543,996, as against 15,419,075 in 1901. It was agreed that about 14 per cent. less timber should be brought out of the forests next winter. The decrease of timber exported in 1902 from Helsingfors is (remarks Mr. Cooke in conclusion) very serious. In 1900 the value exported was 212,000*l.*, in 1901 124,000*l.*, and in 1902 only 112,000*l.*, and yet the value of this, the most important article for the whole country, rose from 4,060,000*l.* in 1901 to 4,640,000*l.* in 1902.

THE WORKING POPULATION OF LONDON.—The London statistics referred to in a "Note" on another page, and just issued by the London County Council, include a census of the occupations in the various metropolitan boroughs. Dealing with the building trades the volume states that, taking the trade as a whole, the west and south-west of the county include all the boroughs where the largest proportion is found. The numbers engaged in the trade per 1,000 of the population are as follows:—Fulham, 54.98; Hammersmith, 53.33; Battersea, 49.95; Wandsworth, 42.92; Chelsea, 43.72; and Lewisham, 39.08. The smallest proportions are in the City of London, with 9.76; Stepney, with 17.94; and Bethnal Green, with 19.25. In Greater London very large proportions are found, Walthamstow having 57.1; Edmonton, 55.23; Croydon, 54.7; Tottenham, 52.8; Willesden, 52.6; East Ham, 46.0; Enfield, 46.0; and Wood Green, 45.5. Taking the various trades separately, the largest proportion of bricklayers and bricklayers' labourers are in Hammersmith, Fulham, Wandsworth, Lewisham, and Battersea; carpenters and joiners in Fulham, Battersea, Hammersmith, and to a less extent over the whole of South London, except Southwark, Bermondsey, and Greenwich; painters and decorators in Chelsea, Hammersmith, Fulham, St. Marylebone, and Paddington; and plumbers generally over the county with a larger proportion in the west, and a smaller proportion in the central and eastern boroughs. In the engineering trades the largest proportions are in Woolwich, Greenwich, Deptford, and Poplar, and to a less extent in all the other boroughs along the south side of the Thames. In Greater London there are a great number engaged in these trades in West Ham and Erith.

PROPOSED NEW BUILDINGS, NEWPORT, I.W.—At a meeting of the Isle of Wight Town Council, the Mayor moved the adoption of the recommendation that the plans deposited by Mr. Denham for four houses at Hunnyhill be disapproved, as not being in accordance with the by-laws.—The Mayor said the plans did not comply with the by-laws in several important respects. One was that the road on the east side was shown to be only 19 ft. wide, whereas it should be 24 ft. In front Mr. Denham did not show the width of the road at all nor the level and gradient of the road. It was very important that the by-laws should be strictly adhered to so long as it was not an undue hindrance to the building trade.—Ald. Cheverton seconded.—Mr. Purkis moved an amendment that the plans be approved subject to the width of the roadway being marked on the plans. A month ago the plans were sent back for alteration, and he now had a note from the surveyor to the effect that the re-deposited plans appeared to be in compliance with the by-laws. They should pay some regard to what their surveyor said, and not put any undue obstacle in the way of the erection of new buildings. The omission to state the width of the roadway on the plan was a small matter which they could easily get Mr. Denham to remedy. The rough plan since submitted showed that the houses were to face a new road, which was to be 33 ft. wide one end and 36 ft. at the other, and as to the other road, Mr. Denham was giving up 7 ft. in order to make it 19 ft. wide; and if, when building commenced the other side, the owner there also gave up 7 ft., the road would be 26 ft. wide.—Mr. Morgan seconded the amendment, saying they should encourage building as much as possible, and that the objection appeared trifling.—Mr. Purkis said the plans were in accordance with the by-laws, excepting that the width of the roadway was not shown.—Mr. Buckler said the plans went back, and were not amended in accordance with the by-laws.—The Mayor said the object of the committee was to show exactly the circumstances surrounding the proposed new building. The proposed cottages were very small and the rooms low, and it was very important that they should not allow modern slums to be created on their boundaries by the cramming in of small cottages without ensuring a proper width of road, etc.—The amendment was negatived, and the proposition was then carried, Mr. Purkis voting against.—*Isle of Wight County Press.*

SUBSIDENCE OF BLACKWALL PIER.—At the fortnightly meeting of the Managers of the Poplar and Stepney Sick Asylum District, held on the 15th inst., the Blackwall Visiting Committee brought up an important Report dealing with the alleged falling away of Blackwall Pier. It appeared that the Clerk reported to the Committee that he was informed that a portion of the pier adjoining the Branch Asylum had subsided, and that in connexion therewith he had immediately communicated with the Board's architects, asking them to report as to the safety or otherwise of the foundations of the institution. The architects—Messrs. Clarkson—wrote to the effect that they had made several examinations of the river wall in front of the building, and had been in communication with the Engineer to the Dock Companies with the view of ascertaining to what depth the foundations were carried. The records, however, appeared to have been mislaid. It had been found that certain buildings which existed near the Brunswick Hotel about the same time had their foundations carried to a depth of 10 ft. 6 in. below the quay level. It was, of course, impossible to say without examination whether the front wall of the building in question was carried down to a sufficient depth to make it quite secure in the event of the river wall giving way. The Engineer to the Dock Companies stated that a thorough examination of the whole length of the river wall would be made without loss of time. The architects added that, having made a careful inspection of the buildings, they did not find any cause for immediate anxiety, but suggested that they should be instructed to watch the operations of the Dock Companies in the neighbourhood with a view to reporting to the Managers in the event of an adverse development. The Committee recommended that the Clerk's action be approved, and that Messrs. Clarkson be asked to watch the operations of the Dock Companies as suggested. The report was adopted.—*Eastern Post.*

GLASGOW AND WEST OF SCOTLAND TECHNICAL COLLEGE.—The opening lecture of the senior architecture class in this college was delivered on Monday last by Professor Gourlay, the subject being, "The Christian Churches of Athens." The lecturer began by referring to the way in which the Parthenon and other temples were altered to serve as Christian churches. He divided the churches erected by the Christians in the Byzantine style into three distinct types—(1) those possessing a large central dome, as may be seen in the Church of St. Nicodemus; (2) those having a small dome at the "crossing" of the four arms of the Greek cross, as in the Old Cathedral or Metropolis; and (3) those with the basilican or western type of plan, as in St. Mary's of the Great Monastery. The names of the various parts of a Greek church, with the uses to which they were put, were explained. Finally the methods of building used in the churches of Athens, with the architectural results obtained, were studied. The lecture was illustrated by means of photos collected and by sketches drawn by the lecturer while on a recent visit to Athens.—*Glasgow Herald.*

CAPITAL AND LABOUR.

SUNDERLAND JOINERS' DISPUTE.—Mr. A. A. Hudson, a Board of Trade nominee, has been appointed arbitrator to settle the house joiners' strike at Sunderland. No date has yet been fixed upon for the arbitration proceedings.

LEGAL.

WORKMEN'S COMPENSATION ACT.

WHAT IS "PARTIAL CONSTRUCTION"?

AT the Brompton County Court (London) last Friday, before Judge Stonor, William Porter, a builder's labourer, 70, Royal-terrace, Kennington Park, S.E., applied—under the Workmen's Compensation Act—for compensation from Messrs. Aiton and Co., builders, etc., Western Works, Willesden Junction, N.W., in respect of personal injuries, sustained whilst in the respondents' employ.

Mr. McCurdy, counsel, appeared for the applicant, and Mr. Chester Jones, counsel, for the respondents.

Applicant's counsel stated that on May 8 last his client was in the employ of the respondents, assisting in fitting and fixing pipes—mainly water pipes—at the electrical station of the Fulham Borough Council. Some planks had been laid across a hole in an upper floor, and one of these planks slipping as the applicant caught hold of it for the purpose of lowering himself on to a girder, he fell a distance of about 20 ft. One of his legs and one of his wrists were badly injured, and he had been unable up to the present time to do any work. The respondents contended that the man's employment was not employment to which the Act applied, and so it was necessary to go somewhat into details. It appeared that in 1898 the Fulham Borough Council erected a portion of the building in question, the height of which was about 50 ft., leaving room for later extension. In 1902 the Borough Council wished to complete the construction of the building, and accepted three tenders, each for a portion of the work. A tender sent in by the present respondents was one of the tenders accepted, and it was upon work in connexion with this that the applicant was engaged at the time of the accident. He (counsel) would submit that each of these three firms of contractors were "undertakers" within the meaning of the Act.

Evidence was given by officials of the Borough Council, bearing out counsel's statements regarding the description of the building and the nature of the applicant's work. Emphasis was laid upon the statement that in the original design of the building in 1898 room was left for the "extension scheme," upon which the applicant was engaged at the time of the accident.

The applicant spoke as to the accident.

In cross-examination, he said that his work consisted in helping to fix the pipes, some of which were passed through and cemented to brick walls. He did not think that his people used any scaffolding for the work. The plank which slipped was placed in its position by men working for one of the other contractors.

Counsel for the applicant referred to the well-known case of Hoddinott *v.* Newton, Chambers and Co., Ltd., in connexion with which Lord Macnaghten had pointed out that the Workmen's Compensation Act spoke of a building being "constructed," not "erected;" adding that the "construction" might be "partial," *i.e.*, not concerning the erection of the whole building. In accordance with the case referred to, counsel submitted that whenever new material—as in the present case before the Court—was put into a building, there was in such work something of the nature of "construction." It did not matter whether such work were done immediately after the main portion of the building had been completed, or years afterwards. Counsel went on to quote from the cases Mason *v.* Dean—the ruling in which was endorsed in the House of Lords—and Cooper and Keen *v.* Wright, in support of his submission that a person who contracted for and carried out, a portion only of such work as that in question was an "undertaker" within the meaning of the Workmen's Compensation Act.

Counsel for the respondents submitted that the evidence failed to show that his clients were "constructing" the building at the time of the accident; and, secondly, it failed to show that there was "scaffolding" being used. The putting of "chattels" into a building was not part of the work of "building."

The Judge: It would be an addition to the freehold.

Counsel for the respondents: But because it is an addition to the freehold it is not necessarily a part of the building. Would your Honour say that an ordinary looking-glass, when fixed on a wall, becomes part of the building?

The Judge: Yes, when fixed to the wall firmly.

Counsel for the respondents: But in order for my friend to succeed he must prove that the respondents, on May 8, were constructing the building.

The Judge: It was "additional construction."

Counsel for the respondents: Then, I submit that it cannot be said that, on May 8, the building was being constructed by means of "scaffolding," simply because these few boards were left for the men to walk over.

The Judge: I certainly think it was scaffolding; the boards were for men to work upon.

Counsel for the respondents: There was no work being done just there.

His Honour: Or for the workmen to walk upon.

James W. Aplin, the respondents' foreman on the job, gave evidence regarding the precise nature of the work, stating that his people did none of the cementing of the pipes into the walls; they simply fixed them in proper position.

The Judge: I think this work was part of the construction, and had to do with the purpose for which the building was put up; and I think that the applicant is entitled to his compensation.

It was explained that the man's wages had been 30s. a week, and the award was accordingly fixed at 15s. a week. Costs were allowed on the "B" scale.

Counsel for the respondents asked for a stay of execution for three weeks, in case his clients might wish to appeal.

His Honour consented.

RICHMOND ANCIENT LIGHT DISPUTE.

THE case of the London Property Investment Trust, Ltd., *v.* the Corporation of Richmond and Gosling and Son was in the list for hearing before Mr. Justice Bucknill in the Vacation Court on Wednesday.

Mr. Mulligan, K.C., when the case was called on, said that his lordship might remember that this was a motion for an interim injunction to restrain the defendants building so as to infringe the plaintiffs' ancient lights. When it came before Mr. Justice Walton on September 9, the defendants gave undertakings not to build higher until the 16th inst. The case had on the 16th inst. stood over on those undertakings until that day, and it had now been arranged that the undertakings should be continued up to the trial of the action. It was arranged to take an order that the statement of claim should be delivered on or before October 1 next, the statement of defence on or before October 8, reply (if necessary) to be delivered within four days. A cross-order for discovery of documents, that the action should be set down at once, liberty to apply to advance the trial, and that the costs of the present application should be costs in the action.

Mr. Bramwell Davis, K.C., on behalf of the defendants, said he agreed to the order being taken as stated by his learned friend, the plaintiffs giving the usual undertaking in damages.

His lordship assented to the application.

PATENTS OF THE WEEK.

APPLICATIONS PUBLISHED.*

23,172 of 1902.—L. SCHLENTHEIM AND DIESPEKER, LTD.: *Domestic Baths, Handbasins, Scullery Sinks, or the like.*

An ornamented bath, handbasin, scullery sink, or the like, formed of a concrete base and having a granito-mastic coating and ornamentation.

25,703 of 1902.—J. D. PRIOR: *A Hot-water Circulating Boiler suitable for Open Fire-grates.*

A hot-water circulating boiler suitable for open firegrates, consisting of a tube with hollow or waterway sides and having a front open flue at bottom, and its top closed by a combined flap and damper, said boiler being fitted to a grate, The invention also consists in hinging the canopies or smoke-preventing hoods of the grates to one side of the same, so as to permit of better access to the upper part of the grate and chimney. It further consists in hinging the front bars to one side of the grate and providing a retaining catch at the other side.

14,556 of 1903.—J. S. BELL: *Tubular Mortise Locks and Latches, and Escutcheons to be Used with such Locks.*

In a tubular mortise latch, the combination of a follower operated by a spindle, a slide the rear end of which is acted upon by said follower, whilst the front end operates a follower acting to retract a latch bolt which is pressed forward by a spring.

15,930 of 1903.—R. ILES: *Ventilating Greenhouses, Botanical Structures, and Buildings Generally.*

In a building, the provision of an upper longitudinal chamber or lantern, the sides of which are perforated, in combination with valves or glazed panels suitably pivoted and provided with seats; and the construction of the chamber with ridging and perforated sides opening into one or more partitions of the lower part of the building, in combination with valves or glazed panels and seatings having a cord, cords, or like means for adjustment.

16,120 of 1903.—E. J. GLACKIN: *Ventilators for Windows and the like.*

This consists in the combination with a window casing, having the sashes therein, of a ventilator pivotally mounted to the casing on the inside of the window at one end thereof and normally hanging parallel thereto when the window is closed in position, so that it can be swung from the vertical position it normally occupies to any desired inclination to bring its lower edge against the displaced sash to co-operate therewith, and means for swinging said ventilator and for securing it in the position to which it may be moved.

16,429 of 1903.—H. A. PRICE and F. W. TURNER: *Gas Cooking Stoves.*

This invention relates to the construction of a gas cooking stove, with an automatic catch for opening the oven door. An automatic catch is fixed to the outside of the oven and is operated upon by the handle of the cock fixed in the gas supply pipe to the oven, in such a manner that should the cock be turned on at any time either by accident or otherwise, the latch is raised and the oven door opened, and when shut again the catch goes back to its original position, being hung on a centre. By using this catch it is thus impossible for an explosion to take place, as is sometimes the case at present when the gas cock is turned on by accident and the oven fills with gas.

16,327 of 1903.—H. W. D. FIELDING: *Ball-taps for Cisterns.*

This invention has for its object to cause the ball or float-tap to open fully when the flow of water commences and to close quickly when the cistern is sufficiently full. The arrangement consists of a tubular float lever through which the water flows into a small tank provided at the extremity thereof, said tank having a siphon by which the water passing into the tank can flow out into the cistern on its being filled. The tubular float lever is pivoted to the tap casing, and has an arm by means of which the tap is operated to open or close. On the float reaching its lowest position it will be understood that the tank is quickly filled, whereby the tap is immediately opened to its maximum extent.

23,135 of 1902.—W. KOHLMETZ: *Fireproof Ceilings or Roofs.*

In a fireproof flooring, construction, or ceiling, the combination of iron beams, each consisting of parallel upper and lower flanges and a network web rigidly connecting the said flanges, said beams connecting carrying walls and rigidly secured therein, and a layer of stony material supported by and filling the spaces intermediate the iron beams and entirely embedding the same, and the stony material on one side of a beam being connected to that on the other side thereof through the openings in the network web.

23,314 of 1902.—W. QUINE, Jun.: *Dressing, Grading, and Sizing Machines.*

This consists essentially of one or more cylinders or drums of any convenient size or shape, covered with silk wire or perforated or other suitable material, and so placed as to be capable of being violently shaken up and down or to and fro by means of a shaft crank or other suitable device, and of receiving, if desirable, other rotary or oscillating motion.

5,240 of 1903.—R. H. W. KNIGHT: *Conduits or Casings for Electric Conductors.*

A system of sectional circular lap spring-closed jointed tube conduit for protecting insulated electric conductors and wires, with branching-off pieces, angle pieces, diminishing sockets, and fuse boxes, constructed upon the same principle of a sectional circular lap spring-closed joint.

6,848 of 1903.—H. J. HADDAN (A. O. Crozier): *Glazed Bricks.*

The art of making a glazed cement or cementitious brick, consisting in forming the body portion of the brick of cement or cementitious material, and providing such body portion externally with a layer of a mixture or compound comprising a silica or silicate cement, a flux and water or moisture as ingredients, then permitting the said layer to set, and then burning or firing the same in a kiln.

12,853 of 1903.—P. B. GUILHAM: *Floors, Beams, and Methods of Fastening the same for Promoting the Sanitation of Private Dwelling Houses, Barracks, Hospitals, Schools, Public Buildings, and the like.*

The combination of a hooked cramp, consisting of a bolt passing through the lower flange of a bent fastening plate having two opposite flanges, of which the upper one is let into and fixed to the joist, whilst the bolt passes through the lower opposite one which is screwed down by a nut on the bolt, the lower end of the

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

bolt being formed either into a hook fitting under the top flange of an iron girder, or into a forked end by which it is fixed into a cement, concrete, or other support, or the lower end of the bolt itself is screwed into a socket permanently fixed in a paved, cemented, or concreted floor in order to allow the laying down and fixing of a temporary boarded floor.

MEETINGS.

SATURDAY, SEPTEMBER 26.

Devon and Exeter Architectural Society.—Excursion to Dartmouth and Naval College Buildings. Leave Exeter at 8.40 or 10.50 a.m.

THURSDAY, OCTOBER 1.

Builders' Benevolent Institution.—Half-yearly general meeting, Crown and Anchor Hotel, Ipswich. 3 p.m.

FRIDAY, OCTOBER 2.

Architectural Association.—Annual general meeting—President's address, 9, Conduit-street. 7.30 p.m.

TUESDAY, OCTOBER 6.

Institute of Heating and Ventilating Engineers.—Meeting at Holborn Restaurant. 2.30 p.m.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

September 10.—By LANGRIDGE AND FREEMAN. (at Maidstone).

Mereworth, Kent.—Swayhorne Farm, 11a. 1r. 22p., f.	£2,100
Upper Plat, Kent.—Three freehold cottages with farm buildings, area 5a. 3r. 22p.	700
Piece of freehold building land, 1a. 3r. 11p.	100

By WORSFOLD AND HAYWARD (at Dover).

Dover, Kent.—17, Caroline-pl., f., w.r. 15l. 12s.	225
22, Cherry Tree-av., f., q.r. 25l.	420
39, Albany-pl., u.t. 76½ yrs., g.r. 1l., w.r. 12l. 2s. 8d.	155
1 and 2, Shooters-hill, f., w.r. 20l. 7s. 4d.	158

By WALTER BRIERLEY (at Leek).

Leek, Staffs.—Onecote, etc., five freehold farms, also lower and back commons, 409a. 0r. 1p., y.r. 208l. 10s.	7,075
Bradnop, Holly Bush Farm, 98a. 1r. 18p., f., y.r. 100l.	2,360

By WILLSON AND PHILLIPS (at Rochford).

Paglesham, Essex.—The Plough and Sail Inn, f., y.r. 50l.	2,100
"Milton Villa," f.g.r. 5l., reversion in 94 yrs.	121

By W. MARTIN & Co.

Dulwich.—19, Elsie-rd., u.t. 68½ yrs., g.r. 8l. 10s., e.r. 45l.	480

By KING & CHASEMORE.

Billingshurst, Sussex.—Duncan's Estate, 117 a. 2 r. 16 p., f.,	2,400
Valeland Farm, 115 a. 3 r. 35 p., f.	1,425
Enclosures of land, 17 a. 3 r. 6 p., f.	400
Pear Tree Field, 9 a. 0 r. 24 p., f.	200
North Field, 7 a. 2 r. 11 p., f.	150
Washington, Sussex.—Bostal Meadow, 2 a. 3 r. 22 p. f.	250
White Acres enclosures, 3 a. 3 r. 38 p. f.	300

September 11.—By G. LOVEITT AND SONS (at Coventry).

Fillongley, Warwick.—Four freehold fields, 12a. 2r. 25p., y.r. 15l.	1,020
The Manor House, f. and c., y.r. 17l.	550
Ryton-on-Dunsmore, Warwick.—Freehold cottage with farm buildings, area 15a. 2r. 19p., y.r. 35l.	940

By HANNAFORD AND SON (at Exeter).

Chumleigh, Devon.—The Colleton Estate, 552a., f.	13,400
Hart's Ground and Clapham Moor, 30a., f.	700

September 12.—By SPELMANS' (at Norwich).

Hethersett, Norfolk.—The Old Hall Estate, 49a. 0r. 27p., f.	4,000
The Dealer's Occupation, 8a. 3r. 0p., f.	450
Two freehold enclosures, 2a. 3r. 18p.	68

September 14.—A. SAVILL AND SONS.

Doddinghurst, Essex.—Wishfields Farm, 96a. 0r. 10p., f. and c.; y.r. 95l.	2,000
Collier Row, Essex.—A freehold cottage and enclosure of land, 25a. 1r. 8p., y.r. 50l.	1,010

By PERKINS AND SONS (at Southampton).

St. Deny's, Hants.—7 to 21 (odd), Kent-rd., part freehold and part u.t. 95 yrs., g.r. 7l. 16s., w.r. 126l. 2s.	1,315

By PROTHEROE AND MORRIS (on the Estate).

Newhaven, Sussex.—Station-rd., etc., 53 plots of freehold building land (in lots)	768
Main rd., a freehold meadow, 2a. 0r. 10p.	180

September 15.—By FRED VARLEY AND SON.

Chiswick.—56 and 58, Burnaby-gdns., u.t. 97 yrs., g.r. 17l., e.r. 64l.	815
Stoke Newington.—53, Lordship-rd., u.t. 58 yrs., g.r. 4l. e.r. 70l.	575

By WYATT AND SON (at Havant).

Bedhampton, Sussex.—Freehold house and shop, y.r. 20l.	470
Six freehold cottages, w.r. 48l. 2s.	700

September 16.—By C. H. BROWN.

Fulham.—69, Fulham Park-gdns., u.t. 74½ yrs., g.r. 6l., y.r. 36l.	£400

By MIDDLETON AND CRACKNELL.

Shepherd's Bush.—24, Melrose-gdns., u.t. 73 yrs., g.r. 6l., p.	500

By DOUGLAS YOUNG AND CO.

Brixton.—38, Acre-ln., u.t. 24½ yrs., g.r. 1l. 2s., e.r. 45l.	385

By W. GRAHAM, HITCHCOCKS AND CO., with STEPHENSON AND ALEXANDER (at Newport).

Llangattock-Juxta-Caerlion, etc., Monmouth.—Portions of the Glen Usk Estate, comprising farms, lands, etc., about 1,270 a., f. (in numerous lots)	40,608

September 17.—By H. E. TRAFFORD AND CARTER.

Tottenham.—40 and 42, Chesnut-rd., f., w.r. 55l. 18s.	605

September 18.—By BARR AND GREEN.

Willesden.—15, 23, and 27, Leopold-rd., u.t. 85 yrs., g.r. 15l., w.r. 106l. 12s.	552
8 to 12, Evelyn-villas, u.t. 92 yrs., g.r. 25l., w.r. 171l. 12s.	950
Shepherd's Bush.—14 and 16, Abdale-rd., f., w.r. 85l. 10s.	875
Croydon.—24, 25, and 27, Clyde-rd., u.t. 62 yrs., g.r. 25l. 10s., y.r. 90l.	630

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; p. for possession; e.r. for estimated rental; w.r. for weekly rental; q.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; la. for lane; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdns. for gardens; yd. for yard; gr. for grove; b.h. for beer-house; p.h. for public-house; o. for offices; s. for shops.

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£	s.	d.	
Hard Stocks	1	16	0	per 1,000 alongside, in river
Rough Stocks and Grizzles.....	1	13	0	,, ,, ,,
Facing Stocks....	2	12	0	,, ,, ,,
Shippers	2	5	0	,, ,, ,,
Flettons	1	10	0	,, at railway depôt
Red Wire Cuts ..	1	13	0	,, ,, ,,
Best Fareham Red	3	12	0	,, ,, ,,
Best Red Pressed Ruabon Facing	5	0	0	,, ,, ,,
Best Blue Pressed Staffordshire ..	4	5	0	,, ,, ,,
Do. Bullnose	4	11	0	,, ,, ,,
Best Stourbridge Fire Bricks	4	8	0	,, ,, ,,
GLAZED BRICKS.				
Best White and Ivory Glazed Stretchers.....	13	0	0	,, ,, ,,
Headers	12	0	0	,, ,, ,,
Quoins, Bullnose, and Flats.....	17	0	0	,, ,, ,,
Double Stretchers	19	0	0	,, ,, ,,
Double Headers..	16	0	0	,, ,, ,,
One Side and two Ends.....	19	0	0	,, ,, ,,
Two Sides and one End	20	0	0	,, ,, ,,
Splays, Chamfered, Squints.....	20	0	0	,, ,, ,,
Best Dipped Salt Glazed Stretchers and Headers	12	0	0	,, ,, ,,
Quoins, Bullnose, and Flats.....	14	0	0	,, ,, ,,
Double Stretchers	13	0	0	,, ,, ,,
Double Headers..	14	0	0	,, ,, ,,
One Side and two Ends.....	13	0	0	,, ,, ,,
Two Sides and one End	15	0	0	,, ,, ,,
Splays Chamfered, Squints.....	14	0	0	,, ,, ,,
Second Quality White and Dipped Salt Glazed	8	0	0	,, less than best.

	s.	d.	
Thames and Pit Sand	6	9	per yard, delivered
Thames Ballast	6	0	,, ,,
Best Portland Cement	30	0	per ton, delivered.
Best Ground Blue Lias Lime..	20	6	,, ,,

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime	12s. 6d. per yard, delivered.
Stourbridge Fire-clay in sacks 27s. 6d. per ton at rly. dpt.	

STONE.

	s.	d.	
BATH STONE—delivered on road waggons, Paddington depôt	1	6½	per ft. cube
Do. do. delivered on road waggons, Nine Elms depôt	1	8½	,, ,,
PORTLAND STONE (20 ft. average)—			
Brown Whitbed, delivered on road waggons, Paddington depot, Nine Elms depot, or Pimlico Wharf	2	1	,, ,,
White Basebed, delivered on road waggons, Paddington depot, Nine Elms depot, or Pimlico Wharf....	2	2½	,, ,,

PRICES CURRENT (*Continued*).

STONE.

	s.	d.	
Ancaster in blocks	1	11	per ft. cube, deld rly. depôt.
Beer in blocks	1	6	,, ,,
Grinshill ,, ...	1	10	,, ,,
Darley Dale in blocks..	2	4	,, ,,
Red Corsehill ,,	2	5	,, ,,
Closeburn Red Freestone	2	0	,, ,,
Red Mansfield ,,	2	4	,, ,,

YORK STONE—*Robin Hood Quality.*

	s.	d.	
Scappled random blocks	2	10	per ft. cube, deld. rly. depôt.
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2	3	per foot super. ,,
6 in. Rubbed two sides Ditto, Ditto	2	6	,, ,,
3 in. Sawn two sides slabs (random sizes)..	0	11½	,, ,,
2 in. to 2½ in. Sawn one side slabs (random sizes)	0	7½	,, ,,
1¼ in. to 2 in. ditto, ditto	0	6	,, ,,
Scappled random blocks	3	0	per ft. cube ,,
6 in. sawn two sides, landings to sizes (under 40 ft. sup.)	2	8	per ft. super. ,,
6 in. Rubbed two sides Ditto	—		,, ,,
3 in. sawn two sides slabs (random sizes)	1	2	,, ,,
2 in. self-faced random flags.....	0	5	,, ,,
Hopton Wood (Hard Bed)	in blocks	2	3 per ft. cube.
,, ,, ,,	6 in. sawn both sides landings	2	7 per ft. super. deld. rly. depôt.
,, ,, ,,	3 in. do.	1	2½ ,, ,,

SLATES.

in.	in.	£	s.	d.	
20×10 best blue Bangor..		13	2	6	per 1000 or 1200 at ry. dep.
20×12 ,, ,, ,,		13	17	6	,, ,,
20×10 best seconds ,,		12	15	0	,, ,,
20×12 ,, ,, ,,		13	10	0	,, ,,
16×8 best ,,		7	0	0	,, ,,
20×10 best blue Portmadoc ..		12	5	0	,, ,,
16×8 best blue Portmadoc		6	5	0	,, ,,
20×10 best Eureka unfading green....		15	2	6	,, ,,
20×12 best Eureka unfading green....		17	2	6	,, ,,
18×10 ,, ,,		12	10	0	,, ,,
16×8 ,, ,,		10	5	0	,, ,,
20×10 permanent green		11	0	0	,, ,,
18×10 ,, ,,		9	5	0	,, ,,
16×8 ,, ,,		8	10	0	,, ,,

TILES.

	s.	d.		
Best plain red roofing tiles..	42	0	per 1,000, at rly. depôt.	
Hip and valley tiles....	3	7	per doz.	,, ,,
Best Broseley tiles	50	0	per 1,000	,, ,,
Do. Ornamental Tiles	52	6	,,	,, ,,
Hip and valley tiles....	4	0	per doz.	,, ,,
Best Ruabon Red, brown or brindled Do. (Edwards)	57	6	per 1,000	,, ,,
Do. ornamental Do.	60	0	,,	,, ,,
Hip tiles	4	0	per doz.	,, ,,
Valley tiles.....	3	0	,,	,, ,,
Best Red or Mottled Staffordshire Do. (Peakes)	51	9	per 1,000	,, ,,
Do. Ornamental Do.	54	6	,,	,, ,,
Hip tiles	4	1	per doz.	,, ,,
Valley tiles.....	3	8	,,	,, ,,
Best "Rosemary" brand plain tiles	48	0	per 1,000	,, ,,
Do. Ornamental Do. 50		0	,,	,, ,,
Hip tiles	4	0	per doz.	,, ,,
Valley tiles	3	8	,,	,, ,,

WOOD.

	At per standard. £	s.	d.	£	s.	d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	15	10	0	16	10	0
Deals: best 3 by 9	14	10	0	15	10	0
Battens: best 2½ in. by 7 in. and 8 in., and 3 in. by 7 in. and 8 in.	11	10	0	12	10	0
Battens: best 2½ by 6 and 3 by 6 ..	0	10	0	less than 7 in. and 8 in.		
Deals: seconds	1	0	0	less than best		
Battens: seconds	0	10	0	,, ,, ,,		
2 in. by 4 in. and 2 in. by 6 in. ..	9	0	0	9	10	0
2 in. by 4½ in. and 2 in. by 5 in. ..	8	10	0	9	10	0
Foreign Sawn Boards— 1 1/2. and 1¼ in. by 7 in.	0	10	0	more than battens.		
¾ in.	1	0	0	,,		
Fir timber: Best middling Danzig or Memel (average specification	At per load of 50 ft. 4	10	0	5	0	0
Seconds	4	5	0	4	10	0
Small timber (8 in. to 10 in.)	3	12	6	3	15	0
Small timber (6 in. to 8 in.).....	3	0	0	3	10	0
Swedish balks	2	15	0	3	0	0
Pitch-pine timber (30 ft. average)..	3	5	0	3	15	0

JOINERS' WOOD.

	At per standard.					
White Sea: First yellow deals, 3 in. by 11 in.	23	0	0	24	0	0
3 in. by 9 in.	21	0	0	22	10	0
Battens, 2½ in. and 3 in. by 7 in.	17	0	0	18	10	0
Second yellow deals, 3 in. by 11 in.	18	10	0	20	0	0
,, ,, 3 in. by 9 in.	17	10	0	19	0	0
Battens, 2½ in. and 3 in. by 7 in.	13	10	0	14	10	0
Third yellow deals, 3 in. by 11 in. and 9 in.	15	10	0	16	10	0
Battens, 2½ in. and 3 in. by 7 in.	11	10	0	12	10	0

[*See also page 327.*

COMPETITIONS, CONTRACTS AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITION.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered
*Reconstruction of Cattle Market	Governors Wakefield Charities	50 guineas and 25 guineas	Dec. 1

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c., supplied by	Tenders to be delivered
Road Works, Rosebery-terrace, Plasmarl	Swansea Corporation	G. Bell, Borough Surveyor, 13, Somerset-place, Swansea	Sep. 29
Road Works, Shipley-road	Tynemouth Corporation	J. F. Smillie, Borough Surveyor, Town Hall, Tynemouth	do.
Shops and Offices, Saville-street, North Shields	do.	do.	do.
Flints, Granite, &c.	Bromley (Kent) R.D.C.	E. Haslehurst, Union Offices, Bromley	do.
Surveyor's Materials	do.	do.	do.
Gravel and Road Metal	Bishop Stortford U.D.C.	T. Swatteridge, North-street, Bishop Stortford	do.
Broken Granite, &c. (1,400 tons)	do.	do.	do.
Sewers, &c., at Lunatic Asylum, Clifton, Yorks	The Visiting Committee	Fairbank & Son, Civil Engineers, Lendal, York	do.
Corrugated Iron Sheds	Walthamstow U.D.C.	G. H. Holmes, Civil Engineer, Town Hall, Walthamstow	do.
Rebuilding Chapel, Landore, Swansea	The Trustees	W. B. Rees, Architect, 37, St. Mary-street, Cardiff	do.
Business Premises, Mile Cross, Halifax	Mr. C. Horner	J. F. Walsh & Nicholas, Architects, Halifax	do.
Plumbing, &c. Work at 6 Houses, Wellington-row	.....	J. S. Moffat, Architect, Whitehaven	do.
Improvement to 16, South Mall, Cork	.....	R. Walker & Sons, Civil Engineers, 17, South Mall, Cork	do.
Alterations to Cottages, Winterhill, Linthwaite	.....	J. E. Lunn, Architect, Milnsbridge, Huddersfield	do.
Chapel and School, Senghenydd, Wales	.....	T. Nicholas, Station House, Senghenydd	Sep. 30
Rebuilding the White Hart Hotel, George-st., Pontypool	.....	Fisher & Sons, Architects, Pontypool	do.
Sanitary Works at Workhouse & Hospital, Dorchester	The Committee	W. J. Fletcher, Civil Engineer, County Hospital, Dorchester	do.
Road Works, &c., Kentisbury	Ilfracombe U.D.C.	The Engineer, Town Hall, Ilfracombe	do.
Road Works, Challacombe	do.	do.	do.
Street Works, New-street	Macclesfield Corporation	Borough Engineer, Town Hall, Macclesfield	do.
Twelve Houses, Scriven, Knaresborough	Messrs. Jas. Grafton & Co.	W. R. Mimns, Architect, 13, Market-street, Bingley	do.
Sewers, &c.	Llandaff R.D.C.	J. Holden, Civil Engineer, 35, St. Mary-street, Cardiff	do.
Church, Grange-road, West Hartlepool	Primitive Methodist Trustees	H. Barnes, Architect, Scarborough-street, West Hartlepool	do.
Main Laying	Dundee Town Council	H. Richardson, Civil Engineer, Dunhope Crescent-road, Dundee	do.
Road Works, &c., Park-road and other streets	Exmouth U.D.C.	S. Hulton, Surveyor, Council Offices, Exmouth	do.
Thirty-five Houses, Cefn Bach Estate	Deri (via Cardiff) Building Club	Jas. Ward, Cascade House, Deri	do.
Sewers, &c., Eastbrook	Llandaff & Dinas Powis R.D.C.	Baldwin Latham, Civil Engineer, 35, St. Mary-street, Cardiff	do.
Drainage Works, Brixton, Devon	Plympton St. Mary R.D.C.	W. E. Horton, Surveyor, Ridgeway, Plympton	do.
House, Longacre-road, Carmarthen	.....	G. Morgan & Son, Architects, King-street, Carmarthen	Oct. 1
Stabling, &c., St. John's, Withycombe, Raleigh	.....	E. H. Harbottle & Son, Architects, County Chambers, Exeter	do.
Kerb, Channel Stones, &c.	Glasgow Corporation	J. Lindsay, City Chambers, Glasgow	do.
Flagging Works, &c., Forge-street	Normanton U.D.C.	C. B. L. Fernandes, Council Offices, Normanton	do.
Sea Wall, &c.	Felixstowe U.D.C.	J. Russell, Civil Engineer, 15, Victoria-street, S.W.	do.
Road Works, Brookside-road	Uttoxeter Town Council	R. W. Marshall, Surveyor, Town Hall, Uttoxeter	do.
Sewerage Works, Wakefield-road	Featherstone (Yorks) U.D.C.	F. R. Rothera, Civil Engineer, Council Offices, Featherstone	do.
Riding School, Hull	Lt.-Col. Lord Wenlock	A. E. Thompson, Architect, Manor-street, Hull	do.
Free Library, Great Crosby	Great Crosby U.D.C.	Anderson & Crawford, 36, Dale-street, Liverpool	Oct. 2
Two Cottages, East Woodley Farm, Newton St. Cyres	Trustees of the Quick Estate	Ellis, Son, & Bowden, Surveyors, Bedford Chambers, Exeter	do.
Road Works, Jameson-road	Hull Corporation	A. E. White, Civil Engineer, Town Hall, Hull	do.
Free Library, College-road	Great Crosby (Lancs.) U.D.C.	Anderson & Crawford, Architects, 36, Dale-street, Liverpool	do.
Additions to Schools	Ballingry (N.B.) School Board	Wm. Birrell, Architect, 200, High-street, Kirkcaldy	do.
New Coast Guard Buildings, Isles of Scilly	Admiralty	Superintending Civil Engineer, H.M. Dockyard, Devonport	do.
Granite Road Metal	Southowram (Yorks) U.D.C.	R. W. Evans, Commercial Bank Chambers, Halifax	Oct. 3
Shelter	Bridlington Corporation	E. R. Matthews, Civil Engineer, Town Hall, Bridlington	do.
Ironwork, Princes' Parade	do.	Mangnall & Littlewoods, Architects, 42, Spring-gardens, Manchester	do.
Water Supply Works, Rathmullan	Milford (Ireland) R.D.C.	J. M. Robinson, Engineer, 7, East Wall, Londonderry	do.
Kerbing, &c.	Berwick Corporation	Borough Surveyor, Wallace Green, Berwick	do.
Public Library, Carlisle-street	Goole U.D.C.	H. B. Thorpe, Architect, Aire-street, Goole	do.
Public Hall, Cross Hands, Llanelly	.....	D. Jenkins, Architect, Llandilo	do.
Three Houses, Risca, Mon	.....	E. N. Johnson, Architect, Risca, Mon	do.
Works at Mortuary Chapels	Crewe Town Council	G. Eaton-Shore, Borough Surveyor, Town Hall, Crewe	do.
Fire Station, &c., Darklands-road	Swandlincote U.D.C.	T. Kidd, Town Surveyor, Swadlincote	do.
Water Works, Crake Scar	Bishop Auckland R.D.C.	C. Johnston, Surveyor, Cradock-street, Bishop Auckland	Oct. 5
Road Works, &c., Upper Park-road, Camberley	Frinley U.D.C.	F. C. Wren, Surveyor, High-street, Camberley	do.
Sewerage Works	Leeds Town Council	Spinks & Pilling, Engineers, 20, Park-row, Leeds	do.
Schools, Pickering, Yorks	Grammar School Governors	John Bilson, Architect, 23, Parliament-street, Hull	do.
Police Station, Bloomsbury-street	Birmingham Corporation	J. Price, City Engineer, Council House, Birmingham	do.
Additions to Hospital, Townsend-street, Belfast	.....	W. J. Fennell, Architect, 2, Wellington-place, Belfast	do.
Shops and Houses, Portsoy, N.B.	.....	R. B. Pratt, Architect, Elgin	do.
Vicarage, Harrington, Cumberland	.....	J. F. Curwen, Architect, 26, Highgate, Kendal	Oct. 6
New Roads and Sewers, Acton Green	.....	Monson & Sons, Architects, Grosvenor House, Acton Vale, W.	Oct. 7
Sixteen Cottages	.....	D. J. Purcell, Council Offices, Naas	do.
Additions to Works, Halifax	Naas (Ireland) R.D.C.	Jackson & Fox, Engineers, 7, Rawson-street, Halifax	Oct. 8
New Coast Guard Station, Walton Creek	Campbell Gas Engine Co., Ltd.	Director of Works Department, 21, Northumberland-avenue, W.C.	Oct. 9
Roadmaking, Lighting, &c., Works	The Admiralty	Council's Surveyor, Church-road West, Hanwell, W.	Oct. 12
Sewage Works Extension	Hanwell U.D.C.	H. Shaw, Civil Engineer, Town Hall, Ilford	Oct. 13
Clearing Site	Ilford U.D.C.	Borough Surveyor, Town Hall, Bethnal Green	do.
Depot Buildings, Blackheath	Bethnal Green Borough Council	Council's Surveyor, Town Hall, Greenwich-road, S.E.	Oct. 15
Underground Convenience, Blackwall-lane	Greenwich Borough Council	do.	do.
Wrot-Iron Uncilmbable Fence	do.	Clerk's Office, 57, North-hill, Colchester	Oct. 19
Reservoir, Penceiu, Wales	Colchester Guardians	J. Davies & Son, Civil Engineers, Llanelly	Oct. 31
Stabling, &c., Netherwood, Utley, Yorks	Tregaron District Council	Moore & Crabtree, Architects, York Chambers, Keighley	No date.
Two Semi-Detached Villas, Skircoat, near Halifax	.....	Horsfall & Son, Architects, 22A, Commercial-street, Halifax	do.
Chapel and Schools, Senghenydd	.....	T. Nicholas, Station House, Senghenydd	do.
Ten Houses, Fochriw (Wales)	.....	W. Walters, 5, Dynevor-street, Fochriw	do.
Mission Church, Pwll (Llanelly)	.....	C. A. Jones, Cilymaenlly, Llanelly	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Application to be in
*Clerk of Works	Pontypridd U.D.C.	3l. 3s. per week	Sep. 30
*Architectural Assistant	Fulham Borough Council	2l. 2s. per week	Oct. 3
*Clerk of Works	Devizes Joint Hospital Committee	Not stated	Oct. 10

* *Those marked with an asterisk (*) are advertised in this Number.* *Competition*, iv. *Contracts*, iv. vi. viii. & x. *Public Appointments*, xvii.

PRICES CURRENT (*Continued*).

WOOD.

	£ s. d.	£ s. d.
Petersburg: first yellow deals, 3 in. by 11 in.	21 0 0	22 10 0
Do. 3 in. by 9 in.	18 0 0	19 10 0
Battens	13 10 0	15 0 0
Second yellow deals, 3 in. by 11 in.	16 0 0	17 0 0
Do. 3 in. by 9 in.	14 10 0	16 0 0
Battens	11 0 0	12 10 0
Third yellow deals, 3 in. by 11 in.	13 10 0	14 0 0
Do. 3 in. by 9 in.	13 0 0	14 0 0
Battens	10 0 0	11 0 0
White Sea and Petersburg:—		
First white deals, 3 in. by 11 in.	14 10 0	15 10 0
" " 3 in. by 9 in.	13 10 0	14 10 0
Battens	11 0 0	12 0 0
Second white deals 3 in. by 11 in.	13 10 0	14 10 0
" " " 3 in. by 9 in.	12 10 0	13 10 0
" " " battens	9 10 0	10 10 0
Pitch-pine: deals	16 0 0	18 0 0
Under 2 in. thick extra	0 10 0	1 0 0
Yellow Pine—First, regular sizes	33 0 0	upwards.
Oddments	22 0 0	24 0 0
Seconds, regular sizes	24 10 0	26 10 0
Yellow Pine Oddments	20 0 0	22 0 0
Kauri Pine—Planks, per ft. cube	0 3 6	0 4 6
Dantzig and Stettin Oak Logs—		
Large, per ft. cube	0 2 6	0 3 6
Small " "	0 2 3	0 2 6
Wainscot Oak Logs, per ft. cube	0 5 0	0 5 6
Dry Wainscot Oak, per ft. sup. as inch	0 0 7	0 0 8
½ in. do. do.	0 0 6½	- - -
Dry Mahogany—Honduras, Tabasco, per ft. sup. as inch	0 0 9	0 0 11
Selected, Figury, per ft. sup. as inch	0 1 6	0 2 0
Dry Walnut, American, per ft. sup. as inch	0 0 10	0 1 0
Teak, per load	17 0 0	21 0 0
American Whitewood Planks—		
Per ft. cube	0 4 0	- -
Prepared Flooring—	Per square.	
1 in. by 7 in. yellow, planed and shot	0 13 6	0 17 6
1 in. by 7 in. yellow, planed and matched	0 14 0	0 18 0
1¼ in. by 7 in. yellow, planed and matched	0 16 0	1 1 6
1 in. by 7 in. white, planed and shot	0 11 6	0 13 6
1 in. by 7 in. white, planed and matched	0 12 0	0 14 0
1¼ in. by 7 in. white, planed and matched	0 14 6	0 16 6
⅞ in. by 7 inch yellow matched and beaded or V-jointed boards	0 11 0	0 13 6
1 in. by 7 in. do. do. do.	0 14 0	0 18 0
⅞ in. by 7 in. white do. do.	0 10 0	0 11 6
1 in. by 7 in. do. do. do.	0 11 6	0 13 6

6-in. at 6d. to 9d. per square less than 7-in.

JOISTS, GIRDERS, &c.

	In London, or delivered. Railway Vans, per ton. £ s. d.	£ s. d.
Rolled Steel Joists, ordinary sections	6 5 0	7 5 0
Compound Girders " "	8 2 6	9 5 0
Angles, Tees and Channels, ordinary sections	7 17 6	8 17 6
Flitch Plates	8 5 0	8 15 0
Cast Iron Columns and Stanchions, including ordinary patterns	7 2 6	8 5 6

METALS.

	Per ton, in London. £ s. d.	£ s. d.
IRON—		
Common Bars	7 10 0	8 0 0
Staffordshire Crown Bars, good merchant quality	8 0 0	8 10 0
Staffordshire "Marked Bars"	10 10 0	- - -
Mild Steel Bars	8 15 0	9 5 0
Hoop Iron, basis price	9 0 0	9 5 0
" " galvanised	16 0 0	- -
(* And upwards, according to size and gauge.)		
Sheet Iron, Black.—		
Ordinary sizes to 20 g.	9 15 0	- - -
" " to 24 g.	10 15 0	- - -
" " to 26 g.	12 5 0	- - -
Sheet Iron, Galvanised, flat, ordinary quality—		
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.	12 15 0	- - -
" " 22 g. and 24 g.	13 5 0	- - -
" " 26 g.	14 5 0	- - -
Sheet Iron, Galvanised, flat, best quality:—		
Ordinary sizes to 20 g.	16 0 0	- - -
" " 22 g. and 24 g.	16 10 0	- - -
" " 26 g.	18 0 0	- - -
Galvanised Corrugated Sheets:—		
Ordinary sizes, 6 ft. to 8 ft. 20 g.	12 15 0	- - -
" " 22 g. and 24 g.	13 5 0	- - -
" " 26 g.	14 0 0	- - -
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. and thicker	11 15 0	- - -
" " 22 g. and 24 g.	12 15 0	- - -
" " 26 g.	14 0 0	- - -
Cut nails, 3 in. to 6 in.	9 5 0	9 15 0
(Under 3 in. usual trade extras.)		

LEAD, &c.

	Per ton, in London. £ s. d.	£ s. d.
LEAD—Sheet, English, 3 lbs. & up.	14 0 0	- - -
Pipe in coils	14 10 0	- - -
Soil pipe	17 0 0	- - -
Compo Pipe	17 0 0	- - -
ZINC—Sheet—		
Vieille Montagne ton	26 0 0	- - -
Silesian	25 15 0	- - -

PRICES CURRENT (*Continued*).

LEAD, &c.

	Per ton. in London. £ s. d.	£ s. d.
COPPER—		
Strong Sheet per lb.	0 0 10½	- - -
Thin "	0 0 11½	- - -
Copper nails "	0 0 11	- - -
BRASS—		
Strong Sheet per lb.	0 0 10	- - -
Thin "	0 0 11	- - -
TIN—English Ingots "	0 1 4	- - -
SOLDER—Plumbers' "	0 0 6	- - -
Tinmen's "	0 0 5	- - -
Blowpipe "	0 0 9	- - -

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	2½d. per ft. delivered.
" fourths	1¾d. " "
21 oz. thirds	3¼d. " "
" fourths	2¾d. " "
26 oz. thirds	3¾d. " "
" fourths	3¼d. " "
32 oz. thirds	4¼d. " "
" fourths	4¾d. " "
Fluted sheet, 15 oz.	2¾d. " "
" 21 oz.	3¼d. " "
½ Hartley's Rolled Plate	1¾d. " "
⅝ " " "	2d. " "
¾ " " "	2¾d. " "

OILS, &c.

		£ s. d.
Raw Linseed Oil in pipes or barrels	per gallon	0 1 10
" " in drums	"	0 2 2
Boiled " in pipes or barrels	"	0 2 1
" " in drums	"	0 2 5
Turpentine, in barrels	"	0 3 3
" in drums	"	0 3 10
Genuine Ground English White Lead	per ton	19 0 0
Red Lead, Dry	"	19 0 0
Best Linseed Oil Putty	per cwt.	0 3 0
Stockholm Tar	per barrel	1 12 0

VARNISHES, &c.

	Per gallon. £ s. d.
Fine Pale Oak Varnish	0 3 0
Pale Copal Oak	0 10 6
Superfine Pale Elastic Oak	0 12 6
Fine Extra Hard Church Oak	0 10 0
Superfine Hard-drying Oak, for Seats of Churches	0 14 0
Fine Elastic Carriage	0 12 6
Superfine Pale Elastic Carriage	0 16 0
Fine Pale Maple	0 16 0
Finest Pale Durable Copal	0 18 0
Extra Pale French Oil	1 1 0
Eggshell Flatting Varnish	0 18 0
White Copal Enamel	1 4 0
Extra Pale Paper	0 12 0
Best Japan Gold Size	0 10 6
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 3 6
Berlin Black	0 16 0
Knotting	0 10 0
French and Brush Polish	0 10 0

PUBLISHER'S NOTICES.

THE INDEX (with TITLE-PAGE) for VOLUME LXXXIV. (January to June, 1903) was given as a supplement with the number for July 11.

CLOTH CASES for Binding the Numbers are now ready, price 2s. 6d. each; also

READING CASES (Cloth), with Strings, price 2d. each.

THE EIGHTY-FOURTH VOLUME of "The Builder" (bound), price Twelve Shillings and Sixpence.

SUBSCRIBERS' VOLUMES, on being sent to the Office, will be bound at a cost of 3s. 6d. each.

CHARGES FOR ADVERTISEMENTS.

COMPETITIONS, CONTRACTS, ALL NOTICES ISSUED BY CORPORATE BODIES, COUNTY AND OTHER COUNCILS, PROSPECTUSES OF PUBLIC COMPANIES, SALES BY TENDER, LEGAL ANNOUNCEMENTS, &c. &c.

Six lines, or under ..... 2s. 6d.
Each additional line ..... 1s. 6d.

SITUATIONS VACANT, PARTNERSHIPS, APPRENTICESHIPS, TRADE AND GENERAL ADVERTISEMENTS.

Six lines or under ..... 2s. 6d.
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Terms for series of Trade advertisements, and for front page, and other special positions, on application to the Publisher.

SITUATIONS WANTED (Single-handed—Labour only).
FOUR lines or under ..... 2s. 6d.
Each additional line ..... 6d.

PREPAYMENT IS ABSOLUTELY NECESSARY.

*** Stamps must not be sent, but all sums should be remitted by Postal Orders, payable to J. MORGAN, and addressed to the Publisher of "THE BUILDER," Catherine-street, W.C.

Advertisements for the current week's issue are received up to THREE o'clock p.m. on THURSDAY, but "Classification" is impossible in the case of any which may reach the Office after HALF-PAST ONE p.m. on that day. Those intended for the Outside Wrapper should be in by TWELVE noon on WEDNESDAY.

ALTERATIONS IN STANDING ADVERTISEMENTS or ORDERS TO DISCONTINUE same must reach the Office before TEN o'clock on WEDNESDAY MORNING.

The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c. left at the Office in reply to advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

PERSONS Advertising in "The Builder" may have Replies addressed to the Office, Catherine-street, Covent Garden, W.C. *free of charge*. Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage. Unused stamps are returned to advertisers the week after publication.

AN EDITION Printed on THIN PAPER, for FOREIGN and COLONIAL CIRCULATION, is issued every week.

READING CASES { NINEPENCE EACH. By Post (carefully packed) 1s.

TERMS OF SUBSCRIPTION.

"THE BUILDER" (Published Weekly) is supplied DIRECT from the Office to residents in any part of the United Kingdom, at the rate of 19s. per annum (52 numbers) PREPAID. To all parts of Europe, America, Australia, New Zealand, India, China, Ceylon, &c., 26s. per annum. Remittances (payable to J. MORGAN) should be addressed to the publisher of "THE BUILDER," Catherine-street, W.C.

SUBSCRIBERS in LONDON and the SUBURBS, by prepaying at the Publishing Office 19s. per annum (52 numbers) or 4s. 9d. per quarter (13 numbers) can ensure receiving "The Builder" by *Friday Morning's Post*.

TO CORRESPONDENTS.

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article, or to execute or lend a drawing for publication, is given subject to the approval of the article or drawing, when received, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays*. [N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is given, nor any list in which the lowest Tender is under 100*l*., unless in some exceptional cases and for special reasons.]

* Denotes *accepted*. † Denotes *provisionally accepted*.

BACUP.—For the erection of School buildings, Lanehead-lane, for the Corporation. Messrs. Smith & Cross, architects, Town Hall Chambers, Rochdale. Quantities by the architects:—

Masonry.—Wm. Coupe, Waterfoot.*
Carpentry and Joinery.—J. W. Sutcliffe, Bacup.*
Iron and Steel Work.—J. J. Smithies, Rochdale.*
Slating.—Rushton & Sons, Bacup.*
Plastering.—Fielding Bros., Bacup.*
Painting and Varnishing.—W. J. Jackson, Bacup.*
Plumbing and Glazing.—Robert Clegg, Bacup.*
Dado Tiling.—F. S. Ross, Rochdale.*
Wood-block Flooring.—Roger & Lowe, Ltd., Farnworth.*
Asphalting.—W. Shepherd, Rochdale.*
Ventilating.—Bedford & Co., Halifax.*
Heating.—J. Butterworth, Rochdale.*
Cloakroom Fittings.—Brooks & Co., Ltd., Manchester.*
Movable Partition.—Hy. Whiteley, Rishworth.*
Total £4,515 16 7

CROYDON.—For the erection of a Board School, Ingram-road, Thornton Heath, for 1,166 children. Mr. H. Carter Pegg, F.R.I.B.A., Thornton Heath, architect:—

Roberts & Co.	£20 948	J. & C. Bowyer	£18,300
C. Ansell	19,500	Smith & Sons, Ltd.	18,186
Leslie & Co., Ltd.	19 495	Akers & Co.	18,128
Cook & Sons	19,150	J. & M. Patrick	17,900
Smith & Sons	18 945	Bulled & Co.	17,153
Rowland Bros.	18 598	Knight & Son	16,987
Martin Wells & Co.	18,596	Kerridge & Shaw, Cambridge†	16,029
Wilcock & Co.	18,500		

† Recommended for acceptance.

DOVER.—For the erection of a Congregational Church, High-street, Dover. Messrs. Cresswell & Newman, and Mr. W. Beeston, joint architects, 54, Castle-street, Dover. Quantities by the architects:—

Tuff & Miskin	£7,309 9	W. J Adcock	£6 850 0
E. Stokes	7,306 0	Game	6,774 0
Lewis & Son	7,250 0	Paramor	6 589 0
Warren & Son	7,142 0	Austin & Simms	6,421 0
J. J. Beaufoy	7,116 8	R. Brisley, Dover*	6,342 10
Denne	6,941 0	G. Munro	5 927 0
J. Wise	6,900 0		

DUNSTABLE.—For the supply of granite road-metal for the Town Council. Mr. George Simcox, Borough Surveyor, Town Hall, Dunstable:—

	Per ton. s. d.
Chas. Abell, Hartahill, near Atherstone*	9 9
Whitwick Granite Co., Whitwick*	9 2

Steam Rolling.

G. E. Gould, Hornsey*:—
Rolling ..... £1 5 0 per day.
Scarifying ... 0 0 0½ per yard super.

HERNE BAY.—House, Hill Top-road, for Mr. J. Parker Ayers. Mr. C. E. Hutchinson, 11, John-street, Bedford-row, architect:—

F. W. Baverstock	£535
A. W. Woolf, Herne Bay*	478

[*See also next page.*

LEATHERHEAD.—For the construction of sewers, &c., for the Urban District Council. Mr. T. Salkield, surveyor, Council Offices, Leatherhead :—

Soan	£1,147	17	6	Catley	£885	0	0
Wimpey & Co.	1,075	0	0	Streeter & Todhunter	845	0	0
Meston	963	12	5	Osenton	836	0	0
Kavanagh & Co.	953	14	4	May*	774	8	3
Iles	926	0	0	Davies, Ball, & Co.	750	0	0
Jackson	903	3	0	Swaker	741	0	0
Kettingham	892	0	0				
Free & Sons	886	19	6				

[Surveyor's estimate, £938.]

MACCLESFIELD.—For the erection of three shops, Bollington, for the Equitable Provident Society, Ltd. Messrs. Whittaker & Bradburne, architects, 19, King Edward-street, Macclesfield. Quantities by Mr. F. Hewitt, Manchester :—

Roylance & Co., Ltd.	£1,820	0	0	Gorton & Wilson	£1,580	0	0
J. Clayton	1,635	0	0	Berry & Sons, Macclesfield*	1,578	17	7
W. T. Beard	1,600	0	0	J. Dakin	1,566	0	0
				Clayton Bros.	1,450	0	0

MORTON (Notts.).—For erection of house at Morton, near Newark. A. R. Calvert and William R. Gleave, architects, 18, Low Pavement, Nottingham :—

W. Smith, Newark* £875

[Lowest of ten tenders.]

NEWARK.—For the erection of infirmary buildings, Bowbridge-road, for the Guardians. Mr. A. Marshall, architect, King-street, Nottingham. Quantities by Mr. C. Pearson Shaw, Angel-row, Nottingham :—

Eastwood & Co.	£11,928	8	0	Williamson & Co.	£10,847	18	11
Moss & Sons	11,150	0	0	J. Wright	10,408	0	0
Crane & Co.	11,100	0	0	F. Evans	10,307	0	0
Vickers & Co.	10,940	0	0	T. Barlow	10,294	0	0
Fish & Sons	10,823	0	0	W. Smith, Newark*	10,290	0	0
Brown & Son	10,588	0	0	T. H. Harper	9,830	0	0

NOTTINGHAM.—For erection of house, Sherwood-rise, Nottingham. A. R. Calvert and William R. Gleave, architects, 18, Low Pavement, Nottingham :—

Crane, Ltd.* £1,185

[Lowest of nine tenders.]

OAKENGATES.—For the construction of sewers and sewage disposal works for the Urban District Council. Mr. R. E. W. Berrington, M.Inst.C.E., Bank Buildings, Wolverhampton :—

E. H. Page	£11,902	J. Owen	£8,500
Braithwaite & Co.	9,802	H. Holloway, Wolverhampton*	7,807
W. H. Reading	8,800		

PADIHAM (Lancs).—For the erection of St. Leonard's National Schools. Mr. Thos. Bell, architect, 14, Grimshaw-street, Burnley :—

Excavating and Masonry.—Smith & Sons, Burnley.*
Carpentry and Joinery.—J. Bertwistle, Padiham.*
Plastering and Concreting.—Rawlinson & Sons, Burnley.*
Slating.—Foster & Sons, Padiham.*
Plumbing.—Pollard, Padiham.*
Painting.—Smith & Son, Padiham.*
Gates and Railing.—T. Ashworth, Burnley.*
Ironfoundery.—W. Walton, Burnley.*

STAMFORD.—For making-up, &c., private streets, Northfields Estate, for the Corporation of Stamford. Mr. T. W. Hayward, A.M.Inst.C.E., engineer, 6, St. Mary's-street, Stamford :—

A. Jewell	£1,565	0	0
Bentley & Loch	1,504	15	10
J. Woolston	1,397	0	0
J. C. Trueman	£1,239	0	0
Borough Surveyor	1,200	0	0

WEM (Salop).—For the erection of a market house, assembly hall, &c., for the Urban District Council. Mr. James Brown, architect, 12, Castle-street, Shrewsbury :—

G. Edge	£4,670	T. Pace	£3,667
R. Whittingham	4,450	Gettim & Co.	3,647
G. Dodd	3,902	G. H. Nicholas	3,632
T. Jervis	3,875	Treasure & Son	3,619
Tommy & Co.	3,862	G. Bullock	3,470
J. Hayes	3,800	T. Huxley	3,400
G. H. Bickerton	3,775	Morris & Sons	3,343
H. Price	3,765	G. Phillips, Wem*	3,330
Price & Sons	3,700		

WREXHAM.—For works at the fever hospital, for the Rural District Council. Mr. G. Morison, architect, King-street, Wrexham. Quantities by the architect :—

W. H. Wycherley	£550	0	0
H. A. Jones	491	7	9
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